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## Recovery and Allocation of Electromagnetic Field Mitigation Costs in Electric Utility Rates

### Cover Page Footnote

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# RECOVERY AND ALLOCATION OF ELECTROMAGNETIC FIELD MITIGATION COSTS IN ELECTRIC UTILITY RATES

LISA M. BOGARDUS\*

## INTRODUCTION

ALTHOUGH there is no scientific basis to conclude that electromagnetic fields ("EMFs")<sup>1</sup> cause adverse health effects,<sup>2</sup> EMFs are increasingly a subject of controversy in various proceedings to which electric utilities are a party. In these proceedings, stakeholders often demand that utilities take precautionary measures to reduce public exposure to EMFs because future studies may show that EMFs are harmful. Some utilities refuse to take any action until the scientific research conclusively warrants it. Other utilities have adopted policies to minimize EMFs, and in some states, EMF limits are regulatory requirements.

In the meantime, electric utilities are spending significant sums of money on research, education programs, design changes, and litigation

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1. EMFs consist of electric and magnetic fields. Electric fields are created wherever there is an electric charge, and magnetic fields are created wherever electric current flows. Thus, EMFs are present wherever there is electricity, which in the United States is 60-Hertz (Hz) alternating current. An EMF is part of a continuum of frequencies known as the electromagnetic spectrum. At one end of the spectrum are the highest frequencies, produced by, for example, gamma rays and x-rays, and at the opposite end are extremely low frequencies produced by, for example, high-voltage transmission lines. Electric fields are measured in kilovolts per meter (kV/m), and magnetic fields are measured in milligauss (mG). For a more comprehensive discussion of EMFs, see U.S. Congress, Office of Technology Assessment, *Biological Effects of Power Frequency Electric and Magnetic Fields* (May 1989) [hereinafter "OTA Report"]; U.S. Dep't of Energy, *Electrical and Biological Effects of Transmission Lines: A Review* (1989).

2. See Oak Ridge Associated Universities, *Health Effects of Low-Frequency Electric and Magnetic Fields* ES-11 (June 1992); *Electromagnetic Fields and the Risk of Cancer*, 3 Documents of the National Radiological Protection Board at 1 & 2 (1992). Although the United States Environmental Protection Agency ("EPA") had concluded in its preliminary draft report on the potential carcinogenicity of EMFs that "magnetic fields from power lines and perhaps other sources in the home [are] a possible, but not proven, cause of cancer in humans," U.S. Envtl. Protection Agency, *Evaluation of the Potential Carcinogenicity of Electromagnetic Fields*, Review Draft at 1-5 (Oct. 1990), an EPA committee concluded that the document contained "serious deficiencies and needs to be rewritten." Nonionizing Elec. & Magnetic Fields Subcommittee, U.S. Envtl. Protection Agency, *An SAB Report: Potential Carcinogenicity of Electric and Magnetic Fields* 1 (Jan. 1992). The EPA's Office of Health and Environmental Assessment announced it would postpone the production of a final EMF report indefinitely because EPA does not "see any big breakthroughs that would change the conclusions reached by other reviews." *EPA Will Indefinitely Postpone Final EMF Report*, EMF News, Aug. 16, 1993, at 1.

fees.<sup>3</sup> This Article addresses who should pay for these costs—ratepayers, utility investors, or both—when it is not known whether and to what degree EMFs may be harmful. If EMFs are later determined to be harmful, should a utility that could have mitigated harm earlier, but did not, be allowed to pass on to ratepayers the added costs to reduce EMFs once they have been determined to be harmful? If EMFs are later determined to be benign, should utility investors pay for the costs of any preventative measures implemented when the research was inconclusive, or should the utility be allowed to include these costs in rate base and earn a return on these EMF-related investments?

Part I of this Article describes the legal contexts in which EMF issues affect electric utilities, such as certification and condemnation proceedings. Part II discusses how regulators and utilities have responded to the uncertainty of EMF health effects, and Part III analyzes possible ratemaking treatment of EMF-related costs and investments for three scenarios: (1) currently, when EMF health effects remain uncertain and inconclusive; (2) if EMFs are later determined to be benign; and (3) if EMFs are later determined to be harmful. Part IV offers a proposal for the ratemaking treatment of EMF-related costs while the health effects of EMFs remain uncertain.

## I. LEGAL CONTEXTS IN WHICH EMF ISSUES AFFECT UTILITIES

The issue of whether EMFs are harmful has been considered in several legal contexts involving electric utilities: (1) administrative proceedings on applications for certificates to construct and operate transmission lines, distribution lines, and substations; (2) condemnation actions by utilities to acquire property for transmission line corridors or rights-of-way; (3) personal injury or property damage lawsuits against utilities; (4) legislative and rulemaking hearings and investigations concerning EMFs from transmission and distribution lines; and (5) electric utility workers' compensation cases. In the future, EMF issues also may arise in utility insurance coverage cases and in rate-recovery cases, the latter of which will be discussed in Part III.

### A. Certification Proceedings

Before a utility can construct and operate a transmission line, the utility must obtain approval, usually in the form of a certificate of public convenience and necessity, from a state's utility commission.<sup>4</sup> The commission is typically prohibited by law from granting the certificate unless the utility applicant demonstrates that there is a "need" for the transmis-

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3. See *\$10 Billion a Year Could End EMF Exposure, Panel Told*, 131 Pub. Util. Fort., May 15, 1993, at 45; Philip S. McCune, *The Power Line Health Controversy: Legal Problems and Proposals for Reform*, 24 U. Mich. J.L. Ref. 429, 431 (1991).

4. See 3 David J. Muchow & William A. Mogel, *Energy Law & Transactions* 80-56 to 80-57 (1993).

sion line.<sup>5</sup> Some state legislation also requires the utility to demonstrate that the route selected is "reasonable" and that the utility "considered" or "minimized" environmental impacts from the line's construction and operation.<sup>6</sup> In many states, the commission must hold a public hearing on the application,<sup>7</sup> in which interested parties may submit testimony and cross-examine witnesses.<sup>8</sup>

EMF issues commonly arise when a party opposed to a proposed line asserts that the proposed line is unsafe because people near the line will be exposed to EMFs.<sup>9</sup> Those in opposition to the line typically argue that the utility should either site the transmission line elsewhere or design it differently.<sup>10</sup> Other opponents have requested a stay on the construction of a proposed line<sup>11</sup> or a moratorium on all new lines until further research is concluded.<sup>12</sup>

### B. Condemnation Proceedings

In addition to obtaining a certificate to construct and operate a transmission line, a utility will often need to acquire private property for the

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5. See Edison Elec. Inst., *Review of State-Level Electric Power Transmission Facility Siting Processes*, I-2 to I-3 (Apr. 10, 1990).

6. See *Re New England Power Co.*, Nos. D.P.U. 89-163 to 89-166, 1993 WL 343567, at \*3 (Mass. Dep't of Pub. Utils. June 25, 1993); *Re Boston Edison Co.*, No. D.P.U. 92-229-A, 1993 WL 343453, at \*2 (Mass. Dep't of Pub. Utils. June 1, 1993).

7. See Edison Elec. Inst., *supra* note 5, at III-5 to III-6.

8. Regulation of transmission-facility siting varies considerably among the states. A survey of regulatory approaches to transmission-facility siting discerned four types of regulatory processes: (1) a regulatory "one-stop" process, in which comprehensive siting legislation authorizes one agency to coordinate and oversee all permitting requirements; (2) a regulatory "multi-stop" process, in which siting legislation exists, but permits are required from more than one agency; (3) no siting regulations exist, but the utility must demonstrate need for the line; and (4) neither siting nor certification requirements exist. See Edison Elec. Inst., *supra* note 5, at II-1.

9. See *infra* note 67 and accompanying text. Similarly, another strategy for opponents to existing or proposed lines is to institute a complaint before a commission against the utility for maintaining an allegedly unsafe transmission line. See *Re Pinckney Neighborhood Ass'n*, No. 183,411-U, 1993 WL 217285, at \*1 (Kan. St. Corp. Comm'n Feb. 1, 1993). Opponents have also alleged that the construction of a transmission line is unlawful. See *Marzolf v. Pacific Gas & Elec. Co.*, No. 92-03-001, 1994 WL 79786, at \*1 (Cal. P.U.C. Jan. 7, 1994) (alleging that environmental review is required before construction). These strategies may be expressions of the "not in my backyard" (NIMBY) syndrome, complaints common to most development projects.

10. See, e.g., *Wisconsin Pub. Serv. Comm'n v. Town of Sevastopol*, 105 Pub. Util. Rep. (PUR) 4th 45 (Wisc. Pub. Serv. Comm'n 1989) (order voiding a municipal ordinance that required all new transmission lines to be built underground).

11. See, e.g., *Re Consumers Power Co.*, 140 Pub. Util. Rep. (PUR) 4th 332, 338 (Mich. Pub. Serv. Comm'n 1993); *Re Hawaiian Elec. Co., Inc.* 7602, 1993 WL 306353, at \*1 (Haw. P.U.C. May 10, 1993) (Commission ordered proposed commitment of funds to construct a transmission line to be laid underground near pedestrian sidewalks suspended until the Commission had an opportunity to examine further the issue of exposure of pedestrians to EMFs).

12. See *Re Ettelson*, No. 93-0162-E-P, 1993 WL 263357, at \*1 (W. Va. Pub. Serv. Comm'n Apr. 23, 1993); *Re Pinckney Neighborhood Ass'n*, No. 183,411-U, 1993 WL 217285, at \*1 (Kan. St. Corp. Comm'n Feb. 1, 1993).

rights-of-way of a proposed line. State legislatures typically delegate the power of eminent domain to utilities for this purpose, which utilities may exercise after a certificate is issued.<sup>13</sup>

EMF issues often arise when a utility exercises its power of eminent domain to take an easement through a property owner's land.<sup>14</sup> Inverse condemnation claims are also common, where a plaintiff alleges that a nearby condemnation of property for the construction and operation of a line will so adversely affect the value of the plaintiff's property so as to require compensation.<sup>15</sup> In these cases, the landowner tries to establish that buyers' fears of EMFs from the transmission line will lower the market value of the landowner's remaining property, and therefore the landowner is entitled to severance damages.<sup>16</sup> In a recent New York case, the state's highest court held that the property owner may establish consequential damages with evidence that fear of the health risks from exposure to transmission lines reduces the property's value without proving that the fear is reasonable.<sup>17</sup>

### C. Personal Injury and Property Damage Cases

EMF personal injury cases usually involve claims that as a result of exposure to EMFs from nearby transmission lines, the plaintiff has developed cancer or other injuries.<sup>18</sup> These plaintiffs have relied on theories of strict product liability,<sup>19</sup> strict liability for ultrahazardous activity, negligence, duty to warn, misrepresentation, battery, negligent and intentional

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13. See, e.g., Ind. Code Ann. § 8-1-8-1 (Burns 1991); Fla. Stat. Ann. § 361.01 (West 1968).

14. See Kristopher D. Brown, Note, *Electromagnetic Field Injury Claims: Judicial Reaction to an Emerging Public-Health Issue*, 72 B.U. L. Rev. 325, 331 (1992); Todd D. Brown, Comment, *The Power Line Plaintiff and the Inverse Condemnation Alternative*, 19 B.C. Envtl. Aff. L. Rev. 655, 668 (1992).

15. See Todd D. Brown, *The Power Line Plaintiff and the Inverse Condemnation Alternative*, 19 B.C. Envtl. Aff. L. Rev. 655, 668 (1992).

16. See McCartin v. San Diego Gas & Elec. Co., No. 699949 (Cal. Super. Ct. May 13, 1994); David Z. Kaufman, Comment, *Efficient Compensation for Lost Market Value Due to Fear of Electric Transmission Lines*, 12 Geo. Mason U. L. Rev. 711, 713 (1990); Philip S. McCune, Note, *The Power Line Health Controversy: Legal Problems and Proposals for Reform*, 24 U. Mich. J.L. Ref. 429, 433-43 (1991); John Weiss, Note, *The Power Line Controversy: Legal Responses to Potential Electromagnetic Field Health Hazards*, 15 Colum. J. Envtl. L. 359, 360 (1990).

17. See *Criscuola v. Power Authority of the State*, 602 N.Y.S.2d 588 (1993).

18. See K. Brown, *supra* note 14, at 332-36.

19. In a minority of jurisdictions, electricity is considered a "product," at least when placed in the stream of commerce. See, e.g., *Pierce v. Pacific Gas & Elec. Co.*, 166 Cal. App. 3d 68, 82 (Cal. Ct. App. 1985) (concluding that electricity delivered to homes and businesses is a product, not a service); *Smith v. Home Light & Power Co.*, 734 P.2d 1051, 1057 (Colo. 1987) (same); *Carbone v. Connecticut Light & Power Co.*, 482 A.2d 722, 723 (Conn. Super. Ct. 1984) (same); *Petroski v. Northern Ind. Pub. Serv. Co.*, 354 N.E.2d 736, 747 (Ind. Ct. App. 1976) (same); *Aversa v. Public Serv. Elec. & Gas Co.*, 451 A.2d 976, 980 (N.J. Super. Ct. 1982) (same); *Ransome v. Wisconsin Elec. Power Co.*, 275 N.W.2d 641, 644 (Wis. 1979) (same); but see Louis L. Boyle, Comment, *Electrifying Solution for the Shocking and Disparate Treatment of Electricity Within Product Liability Law*, 93 Dick. L. Rev. 851, 855 (1989) (discussing electricity as a service).

infliction of emotional stress, and increased risk of injury.<sup>20</sup> Plaintiffs in property damage cases have relied on theories of nuisance, trespass, and inverse condemnation to attempt to prove damages due to the presence of EMFs from transmission lines near their property.<sup>21</sup>

In the first EMF personal injury case to proceed to trial, the jury declined to hold the utility liable for failing to warn the plaintiffs about possible health effects from EMFs and for maintaining a nuisance by operating the line near the plaintiffs' home.<sup>22</sup> In the second personal injury suit to proceed to trial, the jury specifically addressed whether EMFs from the utilities' transmission line caused the plaintiff's cancer, and it returned a verdict that the line did not.<sup>23</sup>

#### D. Regulatory Compliance

State legislatures and public utility commissions have formed special task forces to prepare reports addressing various issues concerning EMFs.<sup>24</sup> Typically, a task force or consultant is required to make specific recommendations to a legislative committee or utility commission either about how to minimize exposure to EMFs or whether the legislature should take precautionary or regulatory measures, or to assess the scientific literature on EMFs.<sup>25</sup>

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20. See Complaint, *Zuidema v. San Diego Gas and Elec. Co.*, No. 638222 (Cal. Super. Ct. May, 1991); Complaint, *Allen v. Alabama Power Co.*, CV-91-321 (Ala. Cir. Ct. May, 1991); see also Pamela J. Laquidara, Note, *Litigating Nonionizing Radiation Injury Claims: Traditional Approaches to a Contemporary Problem*, 10 B.C. Env'tl. Aff. L. Rev. 965, 1011 (1983); K. Brown, *supra* note 14, at 332-33.

21. See *Fantigrassi v. Florida Power & Light Co.*, No. 88-23253 (Fla. Cir. Ct. Feb. 17, 1992); Plaintiff's Fifth Amended Original Petition, *Stewart v. Central Power & Light Co.*, No. 91-5031-c (Tex. Dis. Ct. June 8, 1993).

22. See *Zuidema v. San Diego Gas & Electric Co.*, No. 638222 (Calif. Super. Ct. Apr. 30, 1993).

23. See *Jordan v. Georgia Power Co.*, No. 91-4103 (Ga. Super. Ct. May 24, 1994).

24. See, e.g., California EMF Consensus Group, *Issues and Recommendations for Interim Response and Policy Addressing Power Frequency Electric and Magnetic Fields (EMFs)* (March 20, 1992) (submitted to Public Utilities Commission of the State of California) [hereinafter "Calif. Report"]; Pub. Util. Comm'n of Texas, *Health Effects of Exposure to Powerline-Frequency Electric and Magnetic Fields* (March 1992); Electric Transmission Research Needs Task Force, *Electric and Magnetic Field Reduction: Research Needs* (Jan. 15, 1992) (submitted to Washington State Legislature); Connecticut Academy of Science & Engineering, *Electromagnetic Field Health Effects* (April 1, 1992) (submitted for the Department of Health Services of the State of Connecticut); *Interim Report to the Connecticut Legislature by the Task Force Studying Electric and Magnetic Fields* (Feb. 1, 1992); Khizar Wasti, Virginia Department of Health, *Monitoring of Ongoing Research on the Health Effects of High Voltage Transmission Lines* (March 24, 1993) (submitted to Virginia General Assembly). Sometimes outside consultants are hired to prepare a report on EMFs. See, e.g., Commonwealth Associates Inc., *Cost Effectiveness Analysis: Mitigation of Electromagnetic Fields* (May 29, 1992) (prepared for State of Rhode Island); Thomas N. Duening, *Background Report on the Health Effects of Power Frequency Electric & Magnetic Fields* (April 19, 1990) (prepared for the Oregon Department of Energy).

25. Another approach to studying the EMF issue is to revise the definition of "radiation" in state statutes to include EMFs in order to bring EMFs within the scope of a

### E. *Workers' Compensation*

EMF issues also arise in workers' compensation cases.<sup>26</sup> In the first workers' compensation case involving workplace injuries allegedly resulting from EMF exposure to proceed to trial, the widow of an employee of Seattle City Light filed for death benefits under the State of Washington's industrial insurance statute.<sup>27</sup> She alleged that her husband developed acute lymphocytic leukemia, a very rare form of leukemia in adults, as a result of his exposure to magnetic fields during his employment at Seattle City Light.<sup>28</sup> The Industrial Appeals judge held that "[a]lthough the epidemiological studies taken as a whole show that there is indeed an association between electrical occupations and leukemia," this association alone did not prove that her husband's cancer was proximately caused by exposure to EMFs.<sup>29</sup>

An issue that may arise in occupational personal injury lawsuits against utilities is whether workers' compensation statutes provide the exclusive remedy for personal injuries allegedly caused by EMF exposure during the course of employment. Some states provide an "intentional tort exception" to exclusive coverage of workers' compensation.<sup>30</sup> This exception has been successfully applied in asbestos cases, where the employer intentionally withheld important health information from the employee.<sup>31</sup>

### F. *Insurance Coverage*

Although no cases are yet reported, potential insurance coverage issues involving EMFs include whether an insurance policy applies to EMF claims and, if so, whether a pollution clause nevertheless bars coverage.

A typical comprehensive general liability insurance policy requires the insurer to "pay on behalf of the insured all sums which the insured shall become legally obligated to pay as damages because of a bodily injury or property damage . . . caused by an occurrence."<sup>32</sup> These policies, however, typically exclude:

bodily injury or property damage arising out of the discharge, disper-

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particular agency's responsibility. See James N. Hyde, Jr., Tufts University, *Health Effects of Extremely Low Frequency Electromagnetic Fields* 18 (1991).

26. For a general discussion of how workers' compensation may apply to EMF injury claims, see Pamela J. Laquidara, *Litigating Nonionizing Radiation Injury Claims: Traditional Approaches to a Contemporary Problem*, 10 B.C. Envtl. Aff. L. Rev. 965, 988-93 (1983).

27. See *In re Pilisuk*, No. 92-2051 (Wash. Bd. Indus. App. Apr. 19, 1994) (proposed decision and order).

28. See *id.*

29. *Id.* at 35-36.

30. See 82 Am. Jur. 2d *Workers' Compensation* § 75 (1992).

31. See *Rodgers v. Prudential Ins. Co.*, 803 F. Supp. 1024, 1029 (M.D. Pa. 1992); *Neal v. Carey Canadian Mines, Ltd.*, 548 F. Supp. 357 (E.D. Pa. 1982).

32. Insurance Services Offices, Inc., *Comprehensive General Liability Insurance Form Policy* (1973).



sal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants, pollutants into or upon the land, the atmosphere, or any water-course or body of water, [unless the discharge, dispersal, release or escape is] sudden and accidental.<sup>33</sup>

Thus, like other coverage issues involving environmental damages, potential litigation issues include whether the alleged EMF injury was caused by an "occurrence," and whether the alleged EMF harm, such as negligent infliction of emotional distress, increased risks of contracting a disease, or "cancerphobia," constitute "bodily injury."<sup>34</sup> Other issues might include whether severance damages constitute "property damage,"<sup>35</sup> or whether costs of complying with a commission's order to implement prudent-avoidance measures or an injunction to reroute or bury a transmission line constitute "property damages." Finally, another potential litigation issue between utilities and their insurers is whether EMF damages fall within the "pollution exclusion" clause, and if so, whether they are "sudden and accidental" and nevertheless covered by the insurance policy.<sup>36</sup>

## II. REGULATORY AND UTILITY RESPONSES TO EMF ISSUES

### A. Regulatory Responses

Regulatory responses to the uncertainties of EMF health effects in the above legal contexts range from taking no action to issuing EMF standards. Several utility commissions and legislatures have implemented "prudent-avoidance" policies, which require utilities to reduce magnetic field levels or to take other EMF mitigation action but only if the cost is reasonable. Other commissions have required utilities, as a condition of granting a certificate of public convenience and necessity, to minimize or monitor EMFs. Finally, several states have promulgated EMF standards that apply to the construction of new transmission lines.

#### 1. Prudent Avoidance

An increasingly common regulatory response is to require utilities to adopt a policy of "prudent avoidance" of EMFs when siting and designing transmission lines and associated facilities.<sup>37</sup> In a review of the scien-

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33. *Id.*

34. *See Covering the Fields: Accessing the Historical General Liability Insurance Coverage for Electromagnetic Energy-Related Claims*, Mealy's Litig. Rep., Oct. 7, 1993, at 12, 15-16.

35. *See id.* at 17; Alan S. Rutkin, *Electromagnetic Fields: New-Wave Coverage Issues*, Best's Review, at 62, 98.

36. *See* Eugene R. Anderson & Charles A. Stewart III, *Insurance Coverage for EMF Litigation: Yesterday's Policies Cover New Wave Problems*, EMF Litig. Rep., Aug. 1993, at 14, 20.

37. *See Re Hawaiian Elec. Co., Inc.* 151 Pub. Util. Rep. (PUR) 4th 30, 43 (Hawaii U.C. 1994) (adopting EPA's explanation of prudent avoidance); *infra* notes 42-66.

tific evidence in the EMF health effects literature, the Office of Technology Assessment of the United States Congress ("OTA") defined "prudent avoidance"<sup>38</sup> as a policy that "look[s] systematically for strategies which can keep people out of 60 Hz fields arising from all sources but only adopt[s] those which look to be 'prudent' investments given their cost and our current level of scientific understanding about possible risks."<sup>39</sup> Thus, "avoidance" means implementing measures that minimize exposure to 60-Hz fields, and "prudent" means implementing only those avoidance measures that are cost effective. Prudent-avoidance policies have not been applied to existing transmission lines, except for upgrades or rebuilds. Rather, regulators limit prudent-avoidance policies to the construction of new transmission lines.<sup>40</sup> Prudent avoidance is an imprecise and evolving policy, and it can be expected to change to reflect future medical and technological research, as well as the needs of those promoting its use.<sup>41</sup>

In 1989, the Colorado Public Utilities Commission ("CPUC") was one of the first utility commissions to require a utility to implement prudent avoidance.<sup>42</sup> In 1992, the CPUC codified this policy decision in Rule 18(i) of its Electric Service rules:

The utility shall include the concept of prudent avoidance with respect to planning, siting, construction, and operation of transmission facilities. Prudent avoidance shall mean the striking of a reasonable balance between the potential health effects of exposure to magnetic fields and the cost and impacts of mitigation of such exposure, busy [sic] taking steps to reduce the exposure at reasonable or modest cost. Such steps might include, but are not limited to: (1) Design alternatives considering the spatial arrangement of phasing of conductors; (2) Routing lines to limit exposures to areas of concentrated population and group facilities such as schools and hospitals; (3) Installing higher structures; (4) Widening right of way corridors; and (5) Burial of lines.<sup>43</sup>

Although the term "prudent avoidance" is not always used to describe EMF policies that reduce EMFs at reasonable cost, commissions are in

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38. Prudent avoidance is also referred to as "field management."

39. OTA Report, *supra* note 1, at 77.

40. See *Re Jersey Central Power & Light Co.*, 115 Pub. Util. Rep. (PUR) 4th 542 (N.J. Bd. Pub. Utils. 1990).

41. See Calif. Report, *supra* note 24, at 54 (in noting that the term has been broadened by some, the Consensus Group quoted the originator of the term: "The lesson is clear, 'prudence' is a relative concept. It depends upon the level of a decision maker's concern, their values, and resources.'").

42. See *In re Public Service Co. of Colo.*, No. 89A-028E (Colo. P.U.C. Dec. 20, 1989). The CPUC defined "prudent avoidance" as "the striking of a reasonable balance between avoiding potential harm and the attendant costs and risks." *Id.* at 17. The CPUC ordered the utility to configure the lines in reverse phase, string the lines on single steel poles instead of lattice towers, and maximize the distance of the poles from inhabited properties, steps the CPUC believed would reduce exposure at reasonable cost. *Id.* at 19, 21.

43. *Re Electric & Magnetic Fields*, 137 Pub. Util. Rep. (PUR) 4th 249, 250 (Colo. P.U.C. 1992). The CPUC stated that it specifically endorses the:

fact adopting such policies. For example, in 1989, the Wisconsin Public Service Commission ("WPSC") had investigated EMF issues and concluded that the research did not establish that EMFs associated with transmission lines pose a significant health risk to the public and consequently, overall design and construction changes were not warranted.<sup>44</sup> Nevertheless, the WPSC directed utilities to "evaluate" alternative line configurations and "explore" design changes whenever they proposed to upgrade a line or build a new line.<sup>45</sup> In 1992, the WPSC reviewed the additional research that had been conducted since the last proceeding, and once again it concluded that EMFs associated with transmission lines did not pose a significant health risk to the public.<sup>46</sup> The WPSC now believed, however, that the potential risk, although uncertain, was great enough to warrant additional proactive responses.<sup>47</sup> Therefore, the WPSC now requires utilities, when planning transmission-line projects, to take into consideration the number of people who could be exposed to EMFs from the line and the intensity and duration of exposure. The WPSC requires utilities to form a working group to develop a uniform measurement protocol to measure EMFs for customers, prepare annual reports demonstrating compliance with the order, and incorporate a resource option's ability to reduce EMFs when evaluating their costs and benefits as part of the utilities' integrated resource planning process.<sup>48</sup> Design changes are still not mandatory, however; rather, utilities "should" utilize a low-EMF design for a proposed line, and they "may" choose the design from the best available control technologies.<sup>49</sup>

In adopting amendments to its regulations of utilities proposing to

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concept of *relative* or *comparative risk*. . . Fundamental to this concept are the following points:

- Society should allocate its scarce resources toward problems that pose the highest risk.
- Risks can best be compared on an integrated basis, including across jurisdictional lines, to prevent the *expenditure* of limited resources by one jurisdictional agency on a modest *potential* harm, when that will prevent the expenditure of funds on a more serious problem with more certainty of prevention.
- The Commission intends to be mindful of its responsibility to consider the costs and benefits of its rules on an integrated, societal basis.

*Id.*

44. *See Re Advance Plans for Constr. of Facilities*, 102 Pub. Util. Rep. (PUR) 4th 245, 269 (Wis. Pub. Serv. Comm'n 1989).

45. *Id.* at 269-70. The WPSC also required the utilities to provide the public with information, review research and "participate" through funding in design alternatives that would reduce exposure to EMFs, and create a database on EMFs from facilities. *See id.* at 270.

46. *See Re Advance Plans for Constr. of Facilities*, 132 Pub. Util. Rep. (PUR) 4th 193, 194 (Wis. Pub. Serv. Comm'n 1992).

47. Utilities are still required to comply with the 1989 order. *See, e.g., Re Wisconsin Elec. Power Co.*, No. 6630-CE-178, 1993 WL 176063, at \*7 (Wis. Pub. Serv. Comm'n Jan. 7, 1993) (requiring facility to provide measurements of magnetic fields to continue research on EMF-health effects).

48. *See Advance Plans*, 132 Pub. Util. Rep. (PUR) 4th at 197-198.

49. *See id.* at 197.

build transmission lines, the Ohio Power Siting Board concluded that "[u]ntil such time that [EMF] studies are more conclusive, the Board believes that electric transmission facilities should be designed and sited using methods which *prudently* address EMF issues."<sup>50</sup> The Ohio Power Siting Board amended its regulations to require utilities to: estimate EMF levels beneath power lines and along the rights-of-way; detail the utility's consideration of EMFs, both "as a general company policy and [specifically] in the design and siting" of the line; discuss the utility's procedures for addressing public inquiries about EMFs; and estimate population density adjacent to rights-of-way.<sup>51</sup>

Similarly, the District of Columbia Public Service Commission has proposed to amend its regulations concerning the construction of electric plants to require utilities to evaluate EMFs in their environmental impact statements.<sup>52</sup> Specifically, utilities are required to submit information on: EMF research; whether the proposed action will increase or decrease EMFs and any mitigating measures; and the utility's efforts to measure EMFs in affected communities.<sup>53</sup> The utility must also demonstrate compliance with all laws regulating EMFs, "if and when enacted."<sup>54</sup>

The Public Utility Commission of Texas ("TX PUC") issued a report in March, 1992 on the health effects of EMFs<sup>55</sup> and recommended that: (1) the TX PUC not set EMF standards or guidelines; (2) the TX PUC not expand existing routing criteria to include EMF concerns; and (3) the State of Texas not develop a specific research program at this time.<sup>56</sup> The Report recommended that the Texas Department of Health assume a leadership role in sponsoring public informational meetings and that the utilities and the Department of Health be responsive to the public's need for EMF information.<sup>57</sup> In recommending against including EMF concerns in routing considerations, the TX PUC noted that a policy of prudent avoidance had been the *de facto* policy in TX PUC criteria since 1976.<sup>58</sup> Rather than promulgating regulatory criteria, the TX PUC chose to continue its policy of *de facto* prudent avoidance in the siting of transmission lines.<sup>59</sup>

Task-force recommendations can influence utility commissions' deci-

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50. *Re Electric & Magnetic Fields Emitted from High-voltage Transmission Lines*, 141 Pub. Util. Rep. (PUR) 4th 290, 291 (Ohio Power Siting Bd. 1993) (emphasis added).

51. *Id.*

52. *See Re Procedures to Implement D.C. Code Section 43-1002*, No. 873, 1993 WL 561404, at \*1 (D.C. Pub. Serv. Comm'n Dec. 3, 1993).

53. *See id.* at \*8.

54. *Id.*

55. *See Texas Pub. Util. Comm'n, Health Effects of Exposure to Powerline-Frequency Electric and Magnetic Fields* (1992).

56. *See id.* at xxi-xxii.

57. *See id.* at xxii.

58. *See id.* at xxi.

59. *See id.* The TX PUC has, in fact, continued its policy of prudent avoidance. *See Re Central Power & Light Co.*, 144 Pub. Util. Rep. (PUR) 4th 528, 528 (Tex. P.U.C. 1993).

sions to adopt prudent-avoidance policies. For example, a California EMF Consensus Group issued a report on March 20, 1992, recommending that the California Public Utilities Commission ("CA PUC") take interim actions until the scientific evidence warrants a different regulatory response.<sup>60</sup> The Report recommended that the CA PUC: (1) authorize utilities to conduct further EMF research and hold hearings to determine appropriate expenditures for the research;<sup>61</sup> (2) implement a coordinated EMF Education Plan for electric utility personnel, customers, and others;<sup>62</sup> (3) adopt an interim policy authorizing utilities to implement "no cost" or "low cost" steps to reduce fields;<sup>63</sup> take public concern into account when siting new facilities and authorize utilities to make EMF measurements at customers' residences; and (4) convene public participation hearings to implement these recommendations.<sup>64</sup> The CA PUC subsequently adopted a *de facto* prudent-avoidance policy<sup>65</sup> that applied to new transmission lines and defined "low cost" EMF mitigation measures to mean four percent or less of a specific project's budgeted costs.<sup>66</sup>

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60. The Consensus Group was part of an ongoing investigation of the health effects of EMFs, see *Re Potential Health Effects of Elec. & Magnetic Fields of Util. Facilities*, 119 Pub. Util. Rep. (PUR) 4th 1 (Cal. P.U.C. 1991), and was created to develop interim policies dealing with EMF health concerns for the CA PUC to adopt. See *Re Potential Health Effects of Elec. & Magnetic Fields of Util. Facilities*, No. 91-10-016, 1991 WL 496687, at \*1 (Cal. P.U.C. Oct. 11, 1991) (endorsing creation of the Consensus Group).

61. California EMF Consensus Group, *Issues and Recommendations for Interim Response and Policy Addressing Power Frequency Electric and Magnetic Fields (EMFs)* 2-5 (Mar. 20, 1992).

62. See *id.* at 5-8.

63. See *id.* at 8. The Consensus Group was unable to reach a consensus on the definition of "low cost," and other issues, including whether the CA PUC should prescribe a policy of prudent avoidance for the public. The Consensus Group therefore recommended that whether to exercise prudent avoidance should be left to the individual to decide:

In the absence of specific knowledge of health impacts from EMFs, or which characteristics of EMFs might be of concern, individuals should make their own decisions for action, including "prudent avoidance." People may elect to avoid unnecessary EMF exposure according to their individual values, beliefs, and resources.

*Id.* at 52 (footnote omitted).

64. See *id.* at 11-13.

65. The CA PUC, however, had already applied principles of prudent avoidance in recent decisions. For example, in one proceeding the CA PUC required the applicant to provide information to those in proximity to the transmission line, to measure EMF levels, and to "minimize any increase in field exposure levels." *Re Southern Cal. Edison Co.*, 37 Cal. P.U.C.2d 413 (Sept. 12, 1990).

66. See *Re Potential Health Effects of Elec. & Magnetic Fields of Util. Facilities*, 147 Pub. Util. Rep. (PUR) 4th 361, 366-67 (Cal. P.U.C. 1993) (order instituting investigation to develop policies and procedures for addressing potential health effects of EMFs of utility facilities). The CA PUC stated that "low cost" EMF mitigation measures should be utilized only if they would significantly reduce EMFs. Although some utilities proposed a definition of "significant reduction" in EMFs as a 15 or 20% reduction, the CA PUC declined to quantify "significant reduction." *Id.*

## 2. Maintaining the Status Quo

Another regulatory response is to refrain from requiring utilities to take any action with respect to EMFs. In every certification proceeding in which an opponent of a line contends that EMFs from the proposed line may adversely affect the health and safety of nearby residents, the commission involved has found that the evidence fails to support such assertions.<sup>67</sup> For example, in *Re St. Joseph Light & Power Co.*,<sup>68</sup> intervenors, many of whom were farmers, opposed the siting and design of a proposed transmission line, claiming that EMFs generated by the line would be harmful to their "families, livestock, and livelihoods."<sup>69</sup> The Missouri Commission stated that the intervenors failed to present any evidence that EMFs were a health hazard.<sup>70</sup> "Failing the presentation of such evidence, the Commission cannot order Applicants . . . to adopt preventative or palliative measures to combat a phenomena which, on the basis of the information now before the Commission, may be relatively benign."<sup>71</sup>

In certification proceedings, some commissions have avoided the EMF health-hazard issue altogether by deferring consideration of the issue to an upcoming or current generic-investigation docket,<sup>72</sup> while at least one commission has avoided the issue in a generic investigation by deferring consideration of the issue to an individual certification proceeding.<sup>73</sup> These decisions may illustrate that commissions are reluctant to regulate

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67. See, e.g., *Re Philadelphia Elec. Co.*, No. A-110550FO55, 1993 WL 383052, at \*3 (Pa. P.U.C. 1993) (stating that the evidence fails to show a connection between EMFs and health problems); *Re Nantahala Power & Light Co.*, 141 Pub. Util. Rep. (PUR) 4th 302, 310-11 (N.C. Util. Comm'n 1993) (concluding that studies were inconsistent and inconclusive regarding any correlation between health problems and EMFs); *Re Consumers Power Co.*, 140 Pub. Util. Rep. (PUR) 4th 332, 358 (Mich. Pub. Serv. Comm'n 1993) (holding that the line did not pose a health or safety hazard); *Re Ettelson*, No. 93-0162-E-P, 1993 WL 263357, at \*1 (W. Va. Pub. Serv. Comm'n Apr. 23, 1993) (stating that there is insufficient evidence "to justify an absolute moratorium in the construction of new lines"); *In re Midwest Power*, Nos. E-21043, E-21044, E-21045, 1993 WL 231592, at \*9 (Iowa Utils. Bd. Mar. 9, 1993) (stating that "the consensus of informed observers is that there is no proof electric or magnetic fields (EMF) create an identifiable health risk"); *Re Pinckney Neighborhood Ass'n*, No. 183,411-U, 1993 WL 217285, at \*9 (Kan. St. Corp. Comm'n Feb. 1, 1993) (refusing to issue an order that would assume a cause and effect relationship between EMFs and risks to health without relevant information); *Re Emergency Petition of Non-Noticed Property Owners*, No. A-110550FO55, 1991 WL 476313 (Pa. P.U.C. Mar. 8, 1991) (Commission refused to reopen proceedings or stay the proceedings "for the sole purpose of investigating EMF, which was presently an unresolvable issue").

68. No. EA 90-252 (Mo. Pub. Serv. Comm'n Aug. 1991) (report and order).

69. *Id.* at 5.

70. The Commission noted, however, that it could not conclude that EMFs are safe. See *id.* at 13.

71. *Id.*; see also *Re Union Elec. Co.*, No. EA-91-56, 1991 WL 441890, at \*3 (Mo. Pub. Serv. Comm'n Dec. 13, 1991) (finding no evidence that EMFs are harmful).

72. See *Re Pinckney Neighborhood Ass'n*, No. 183,411-U, 1993 WL 217285, at \*5 (Kan. St. Corp. Comm'n Feb. 1, 1993) (proceeding initiated by a complaint against utility proposing to upgrade transmission line in complainant's neighborhood).

73. See *Re Ettelson*, No. 93-0162-E-P, 1993 WL 263357, at \*1 (W. Va. Pub. Serv.

or address uncertain health risks. For example, in *Re Pinckney Neighborhood Association*,<sup>74</sup> the Commission refused to consider the health effects of EMFs and, instead, would only consider EMFs as a factor, along with costs, in determining the proposed route's reasonableness.<sup>75</sup> The Commission concluded that "to issue binding and perhaps precedential orders which assume a cause and effect relationship between EMF and risks to health without all the relevant information would be counter-productive and irresponsible."<sup>76</sup>

### 3. Conditional Approval of Certification

In the context of proceedings to construct and operate a transmission line, another typical regulatory response is to condition approval of certification upon the utility taking certain actions with respect to EMFs, despite the lack of evidence to support a finding that EMFs are dangerous. These actions include monitoring or conducting research on EMF health effects, providing more information to the public and the commission, or monitoring EMF levels around the utilities' transmission lines or in customers' homes.

In *Re Massachusetts Electric Co.*,<sup>77</sup> although the evidence did not demonstrate that the proposed transmission line would adversely affect residents' health, the Siting Council nevertheless attached a condition to

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Comm'n Apr. 23, 1993) (involving petition for Commission to initiate a rulemaking to consider issuing EMF limits for existing powerlines and a moratorium on new lines).

74. No. 183,411-U, 1993 WL 217285 (Kan. St. Corp. Comm'n Feb. 1, 1993).

75. See *id.* at \*5-6.

76. *Id.* at \*9. Another legal context in which a decision is made to take no action includes commission responses to recommendations from legislatively created task forces. The most common way for a legislature to address the uncertainty of harm from EMFs is to set up a task force or form a legislative committee to study the issue and make recommendations to the legislature. For example, Connecticut legislation created an inter-agency task force to determine the state's appropriate role in addressing EMF issues. In its Interim Report, the Task Force recommended that an active campaign of prudent avoidance was not appropriate until it is better understood whether an EMF hazard exists. See *Report To The Connecticut Legislature By The Task Force Studying Electric And Magnetic Fields*, Interim Report (Feb. 1, 1992). The Task Force also recommended that EMF standards would be premature and that research developments should be followed instead. See *id.* Similarly, in its eighth annual report on ongoing EMF research, the Virginia Department of Health concluded:

Inconsistent and contradictory results in the currently available scientific literature, as well as the constraints of epidemiologic studies, are the reasons that most scientific advisory groups, regulatory bodies, and legislators have been unable to set rational and tenable limits on EMF. Establishment of a health-based standard or guideline is further beset by the fact that high voltage transmission lines are not the sole source of EMF. All electrical and electronic products used in our daily life produce EMF. Exposure to these fields is, therefore, unavoidable. Thus, deriving arbitrary numbers to use as an acceptable level of exposure in the absence of scientific justification may in fact induce a false sense of security.

Virginia Dep't of Health, *Monitoring of Ongoing Research on the Health Effects of High Voltage Transmission Lines*, Eighth Annual Report, at 5 (Mar. 24, 1993).

77. No. 84-24A (Mass. Energy Facilities Siting Council Nov. 21, 1985).

the approval to construct the line, which required the applicant to prepare proposals to monitor EMFs where populations would be exposed.<sup>78</sup> Similarly, in *Re Georgetown University*,<sup>79</sup> the Commission determined that the applicant to construct and operate a cogeneration facility and associated transmission line had adequately considered the environmental impact of the facility as required by law,<sup>80</sup> but the Commission nevertheless required the applicant to provide additional information on transmission line configuration and ordered the applicant to record magnetic fields in strategically located private homes to "perhaps allay some of the public's concerns."<sup>81</sup>

Thus, although these commissions may feel restrained in requiring utilities to implement design changes or reroute lines, or to take other measures to "prudently avoid" human exposure to EMFs, they appar-

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78. See *id.*; see also *Re Boston Edison Co.*, No. D.P.U. 92-229, 1993 WL 344494, at \*8 (Mass. Dep't of Pub. Utils. May 11, 1993) (requiring utility to provide residents with EMF measurements upon request).

79. 131 Pub. Util. Rep. (PUR) 4th 387 (D.C. Pub. Serv. Comm'n 1992).

80. Although the Commission found that the applicant did not adequately consider EMF issues in the environmental impact statement, the Commission found that subsequent testimony on behalf of the applicant was sufficient. However, the Commission expressed its displeasure with the applicant's failure to consider in detail the EMF issues in the environmental impact statement because, in the Commission's view, addressing the issues at an earlier stage might have alleviated some of the public's concern. See *id.* at 435-36. Thus, the Commission may have required the extra research because of the applicant's failure to consider the EMF issues at the appropriate time.

81. *Id.* at 437. In response to an application for the Commission to reconsider its decision and require the applicant to conduct even more studies of the EMF impact of the cogeneration facility, the Commission said:

[U]ntil the scientific community establishes a reasonable standard, there is no benefit to be obtained from additional measurements of EMF. Moreover, the Commission's decision to order further EMF studies does not impact upon the approval of the cogeneration facility. Instead, the additional studies were required to provide the parties and the community with additional information regarding EMF impact.

*Re Georgetown Univ.*, 131 Pub. Util. Rep. (PUR) 4th 457, 461 (D.C. Pub. Serv. Comm'n 1992).

Nevertheless, the Department of Consumer and Regulatory Affairs suspended the project indefinitely until the agency learns more about the health effects of EMFs. Moreover, the Council of the District of Columbia enacted emergency legislation that requires public utilities to prepare an environmental impact statement for transmission lines over 69,000 volts. The Commission held that the legislation applied retroactively to the Georgetown applicant's proposed project and the applicant was required to perform an environmental impact statement on the proposed transmission lines. See *Re Georgetown Univ.*, 147 Pub. Util. Rep. (PUR) 4th 495 (D.C. Pub. Serv. Comm'n 1993). On December 23, 1993, the applicant filed a motion to terminate the proceedings due to the fact that the project was no longer financially viable. See *Re Georgetown Univ.*, No. 10366, 1994 WL 71674, at \*2 (D.C. Pub. Serv. Comm'n Jan. 14, 1994). The applicant complained that the facility had been subjected to "unprecedented" and "plainly duplicative" proceedings by a number of agencies, and that the delays have prevented the applicant from meeting the schedule required in its Power Purchase Agreement. *Id.* As a result, the applicants have filed an \$80 million law suit against the District of Columbia and six government officials. See *Georgetown Owners Sue for \$80 Million Over 'Unlawful' EMF-Related Permit Delays*, Util. Envtl. Rep., Nov. 12, 1993, at 4.



ently believe that public concern about the health effects of EMFs justifies requiring utilities to at least gather and monitor information on EMF health and safety impacts.

#### 4. EMF Standards

Currently, seven states have adopted electric and/or magnetic field limits that apply to the construction of electric transmission lines.<sup>82</sup> These states are Minnesota, North Dakota, Oregon, Montana, New Jersey, New York, and Florida.<sup>83</sup> Electric field limits have been in existence for years, and it is only recently, with the promulgation of Florida's standards and New York's interim standards, that states have issued limits on magnetic fields.<sup>84</sup>

The New York Public Service Commission ("NY PSC") adopted an interim standard on magnetic fields<sup>85</sup> that applies to the edges of rights-of-way of new electric transmission facilities.<sup>86</sup> The NY PSC refused to adopt a standard based on health effects and instead adopted a policy of "prudent avoidance."<sup>87</sup> This policy "support[s] an interim standard that would avoid unnecessary increases in existing levels of exposure to magnetic fields. Such a standard thus would apply only to future transmission line facilities . . . and would not be intended to imply either 'safe' or 'unsafe' levels of exposure."<sup>88</sup> In adopting the policy of prudent avoidance, the NY PSC relied on the OTA Report and the results of a magnetic-field survey conducted by the major electric utilities in the state under conditions specified by the NY PSC staff.<sup>89</sup> The report showed that the average magnetic field at the edges of the rights-of-way for all 345 kV lines in the state was 200 mG, which is the standard the NY PSC adopted.<sup>90</sup> Thus, New York's standard is based on maintaining the status quo,<sup>91</sup> rather than on increasing safety.<sup>92</sup>

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82. In addition, some international organizations and foreign countries have adopted EMF standards. See Public Util. Comm'n of Tex., *Health Effects of Exposure to Power-line-Frequency Electric & Magnetic Fields*, 6.3-6.4 (March 1992).

83. For an overview of each state's standards, see *id.* at 6.5-6.8.

84. See *id.* at 6.6.

85. NY PSC adopted an electric field interim standard of 1.6 kilovolt per meter for transmission facilities in 1978. See *Health/Safety of Extra-High Voltage Lines*, 18 N.Y. Pub. Serv. Comm'n (1978) (cases 26529 and 26559).

86. See N.Y. Pub. Serv. Comm'n, *Proceeding on Motion of the Comm'n as to Regulations Regarding Elec. & Magnetic Field Standards for Transmission Lines* (Sept. 11, 1990) (cases 26529 and 26559) [hereinafter "NY Interim Policy"].

87. *Id.* at 6.

88. *Id.*

89. See NY Interim Policy, *supra* note 86, at 2-3. For a history and discussion of the report and magnetic standards, see Sherry Young, *Regulatory and Judicial Responses to the Possibility of Biological Hazards from Electro-Magnetic Fields Generated By Power Lines*, 36 Vill. L. Rev. 129, 171-178 (1991).

90. This was upheld on appeal in *Atwell v. Power Authority*, 415 N.Y.S.2d 476, 482 (N.Y. App. Div. 1979).

91. This was the Commission's approach in adopting a standard for electric fields in 1978. Although the Commission conceded that the record in that proceeding did not

### B. Utility Responses

Increasingly, utilities are adopting prudent-avoidance measures at the design stage, even if there is no legal obligation to do so.<sup>93</sup> Two utilities have even adopted self-imposed EMF standards,<sup>94</sup> and others have designed their lines to conform with the most stringent existing EMF standards.<sup>95</sup> At least one utility planned to put its proposed transmission line underground to reduce EMF exposure,<sup>96</sup> and another abandoned its plans to construct new lines after customers raised concerns about EMFs.<sup>97</sup> On the other hand, many of the EMF-reducing designs used by utilities could have been implemented initially with purposes other than reducing EMFs, such as avoiding delays and opposition to siting a line, or the choice of a particular design coincidentally may have had lower magnetic fields than other likely alternatives.<sup>98</sup> In these cases, although the designs were not chosen with intentions to "prudently avoid" EMF risks, the implementation of a particular design could be interpreted as a prudent-avoidance measure. These cases could affect a commission's decision on rate recovery: if commissions deny recovery for prudent-avoidance measures because the investments were imprudent given the lack of evidence that EMFs are harmful, then a utility's intentions in implementing an EMF-reducing design may become crucial.

Demonstrating that the design and construction of transmission lines are consistent with prudent avoidance is important in certificate proceedings as well. Commission decisions will often take into account a utility's efforts to reduce EMFs, even though insufficient evidence was presented

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show that EMFs were harmful, the record did contain enough "unrefuted inferences" of possible risk to prompt the Commission to declare a "moratorium" on electric fields higher than those of lines currently operating throughout the state. See *Health/Safety of Extra-High Voltage Lines*, 18 N.Y. Pub. Serv. Comm'n 665, 690 (1978).

92. Cf. M. Granger Morgan *et al.*, *Controlling Exposure to Transmission Line Electromagnetic Fields: A Regulatory Approach that Is Compatible with the Available Science*, Pub. Util. Fort., March 17, 1988, at 49-50, 52 (discussing safety issues generally).

93. See *Re Consumers Power Co.*, 140 Pub. Util. Rep. (PUR) 4th 332 (Mich. Pub. Serv. Comm'n 1993); *In re Nantahala Power & Light Co.*, 141 Pub. Util. Rep. (PUR) 4th 302, 311 (N.C. Utils. Comm'n 1993); *Re Virginia Elec. & Power Co.*, No. PUE890057, 1991 WL 517164, at \*4 (Va. St. Corp. Comm'n June 13, 1991) (noting that construction of substation would actually reduce existing fields because of a cancellation effect).

94. See *Re Delmarva Power & Light Co.*, No. 8430, 1993 WL 595658, at \*11-12 (Md. Pub. Serv. Comm'n Nov. 5, 1993).

95. See *Re Iowa Southern Utilities Co.*, Nos. E-21013, E-21014, 1993 WL 116715, at \*7 (Iowa Utils. Bd. March 4, 1993) (noting establishment of "the most restrictive of any existing standards of EMF").

96. *Pennsylvania P&L To Underground 2.75-Mile Line To Cut Back on EMF*, Util. Envtl. Rep., Feb. 5, 1993, at 13.

97. See *PSI Energy, Nipsco Abandon Power Lines After Customers Express EMF Concerns*, Util. Envtl. Rep., Feb. 18, 1994, at 10.

98. In a survey of electric utilities nationwide, at least one utility reported this as the reason for placing a transmission line underground. See Undergrounding Pol'y Advisory Committee, *Electric Undergrounding Policy Recommendation Report*, at App. D (July 27, 1993) (prepared for the Colorado Springs City Council).

to demonstrate that EMFs are harmful.<sup>99</sup> In *Re Potomac Electric Power Co.*,<sup>100</sup> for example, the Maryland Public Service Commission ("Md. PSC") considered the "extra measures" that the utility undertook to reduce EMFs "consistent with the theory of 'prudent avoidance,'" and it refused to require the utility to make additional design or operation changes. It is unclear, however, whether the Commission would have imposed prudent-avoidance measures if the utility had not already implemented them. Nevertheless, decisions like this one encourage utilities to implement prudent-avoidance measures.

### III. RATEMAKING TREATMENT OF EMF-RELATED COSTS

Utilities face uncertainty in the ratemaking treatment of EMF-related costs in part because it is not known whether EMFs are harmful, and in part because regulators inconsistently apply prudence reviews to utility expenditures. Utilities that implement prudent-avoidance measures today, when there is no scientific basis to conclude that EMFs cause adverse health effects, risk the disallowance of costs associated with those measures. Even if a regulatory agency allows a utility to recover current expenses of prudent-avoidance measures, if EMFs are later determined to be benign, a commission may deny the capital investments in design technologies or wider rights-of-way from inclusion in rate base because such investments may be determined no longer "used and useful." In contrast, if a utility does not implement prudent-avoidance measures today, but EMFs are later determined to be harmful, a commission may deny recovery of expenses incurred as a result of that delay if the utility was imprudent in not implementing prudent-avoidance measures earlier. Thus, the EMF issue has created a serious dilemma for commissions and utilities. In meeting their duty to provide safe and reliable service by implementing prudent-avoidance measures, as insurance against the possibility that EMFs may be harmful, utilities risk disallowance of those costs and potential impairment of their opportunity to earn a reasonable return on their investments. Commissions, on the other hand, must ask themselves whether they are acting responsibly if they allow utilities to recover EMF mitigation costs when there is no scientific basis to conclude that EMFs cause adverse health effects, and whether, if they deny recovery, they are penalizing utilities for implementing precautionary safety measures.

#### A. *The Ratemaking Process and Cost Recovery*

Commissions are responsible for balancing the competing interests of utility investors, ratepayers, and the general public. Utility commissions regulate the rates utilities charge for electric service to prevent the utility

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<sup>99</sup> See *In re Midwest Power*, Nos. E-21043, E-21044, E-21045, 1993 WL 231592, at \*9 (Iowa Utils. Bd. Mar. 9, 1993).

<sup>100</sup> No. 7004, 1990 Md. Pub. Serv. Comm'n LEXIS 59 (May 1, 1990).

from charging monopolistic prices and to ensure that utilities charge customers just and reasonable rates. In fairness to utility investors, however, these rates must also permit investors in stocks and bonds the opportunity to earn a reasonable return on their investments. Commissions are also responsible for protecting the public from unsafe electric service.

The ratemaking process is a long and complicated one, primarily because it involves the setting of rates prospectively. To set these rates, utility commissions generally select a representative test year to provide an approximation of the utilities' future gross revenues and expenses. Commissions use a deceptively simple formula to determine the rates utilities need to charge in order to continue business (i.e., the "revenue requirement"). One way to state this formula is  $R = O + B(r)$ , where  $R$  is the allowed revenue requirement,  $O$  is the utility's operating costs,  $B$  is the utility's rate base, and  $r$  is the utility's rate of return allowed on its rate base.<sup>101</sup> The "rate design" phase follows, in which the utility commission establishes the actual rates that utilities will charge various classes of customers.<sup>102</sup>

Operating expenses usually include operation and maintenance expenses, depreciation and amortization, taxes, fuel, and wages.<sup>103</sup> Commissions review operating expenses because utilities pass these expenses directly on to ratepayers. Moreover, if a utility inflates its operating expenses, which would appear to reduce the utility's profits, the utility could seek a higher rate increase. The fact that a commission disallows an operating expense does not mean that a utility cannot incur the expense. It means only that the utility's investors must bear the cost, rather than the ratepayers. If a commission approves an operating expense, then the utility recovers the expense from ratepayers through its electric rates.

Rate base is the total value of the utility's investment and the capital it uses to provide service.<sup>104</sup> Some items included in rate base are plant-in-service, construction-work-in-progress (CWIP), plant held for future use, and working capital. Plant-in-service includes investments in transmission lines and rights-of-way. In the EMF context, commissions probably would consider investments in design technologies, wider rights-of-way, and more expensive alternative routes to be capital investments that could be included in rate base. Utilities are allowed to earn a rate of return on the capital investments included in rate base, in contrast to operating expenses, which are not permitted a rate of return.

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101. See Richard J. Pierce, Jr., et. al., *Economic Regulation: Energy, Transportation and Utilities* 130 (1980).

102. See Pierce, *supra* note 101, at 259-60.

103. See 3 David J. Muchow & William A. Mogel, *Energy Law & Transactions* 80-7 (1993).

104. See A.J.G. Priest, *Principles of Public Utility Regulation: Theory and Application* 139 (1969).

Commissions use two standards to determine whether utilities should recover costs in rates. Commissions use these standards to act as substitutes for market signals that exist in unregulated markets, not as substitutes for management decision-making.<sup>105</sup> First, under the "used and useful" standard, any property that a utility proposes to include in its rate base must be actually in use, or in use within a reasonable period of time, and providing service to customers.<sup>106</sup> Second, under the prudent-investment test, regulators may disallow investments, either in whole or in part, only if the investments are excessive or were imprudently incurred based on information reasonably available at the time the investment was made, regardless of whether the regulators deem the facilities to be used and useful in hindsight.<sup>107</sup> Historically, regulators had been reluctant to scrutinize expenses unless there was an "abuse of discretion," because regulators are "not empowered to substitute [their] judgment for that of the directors of the corporation."<sup>108</sup>

Regulators' historical reluctance to disallow expenses subsided, however, when utilities confronted commissions with requests for large rate increases, such as those to recover investments in nuclear energy projects<sup>109</sup> and more recently, expensive water treatment plants needed to comply with federal mandates under the Safe Drinking Water Act.<sup>110</sup> In the 1970s, utility management in hindsight incorrectly forecasted the nation's future energy needs and heavily invested in the construction of nuclear power plants.<sup>111</sup> Many of these nuclear plant projects have been canceled, or many plants that were completed now have substantial excess capacity.<sup>112</sup> In addition, other utilities that built plants experienced significant cost overruns. Although regulators typically analyzed costs associated with excess capacity and canceled plants under prudence or used and useful standards, their decisions varied considerably among jurisdictions. For example, while many jurisdictions included the excess

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105. See Robert L. Swartwout, *Current Utility Regulatory Practice from a Historical Perspective*, 32 Nat. Res. J. 289, 308-09 (1992).

106. See Roger D. Colton, *Excess Capacity: Who Gets the Charge From the Power Plant?*, 34 Hastings L.J. 1133, 1149 (1983).

107. See *Duquesne Light Co. v. Barasch*, 488 U.S. 299, 309 (1989).

108. *Missouri ex rel Southwestern Bell Tel. Co. v. Public Serv. Comm'n*, 262 U.S. 276, 289 (1923) (quoting with approval *State Pub. Util. Comm'n v. Springfield Gas & Elec. Co.*, 291 Ill. 209, 234 (1919)).

109. See Paul L. Gioia, *The Prudence Standard: Recent Experience and Future Relevance*, Pub. Util. Fort., April 27, 1989, at 11; Charles M. Studness, *The Regulatory Compact that Never Was*, Pub. Util. Fort., Sept. 1, 1991, at 34, 35; Robert L. Swartwout, *Current Utility Regulatory Practice from a Historical Perspective*, 32 Nat. Res. J. 289, 326 (1992) (noting that a "shift in the burden of proof from the regulatory staff and intervenors to the utility" represented a "critical departure from traditional regulatory practice").

110. See 42 U.S.C. §§ 300f-300j-26 (1988).

111. See Roger D. Colton, *Excess Capacity: A Case Study in Ratemaking Theory and Application*, 20 Tulsa L.J. 402, 402-03 (1985).

112. See, e.g., *id.* at 404-06 (discussing Iowa-Illinois Gas & Electric Company's excess capacity).

capacity in rate base after applying the used and useful test,<sup>113</sup> other jurisdictions denied utilities permission to include portions of nuclear plants representing excess capacity or an abandoned plant in rate base because the excess capacity or the abandoned plant neither provided necessary service nor generated any benefit to ratepayers.<sup>114</sup>

Some commissions that applied the prudent-investment test excluded investment in excess capacity in rate base because "a prudent utility planner would have realized that no plant was necessary" at the time the utility made the decision to construct the plant.<sup>115</sup> Other commissions denied permission to include investment in excess capacity in rate base because the utility management, although initially prudent, imprudently failed to stop constructing new plants after information about the plants' economic infeasibility subsequently became available.<sup>116</sup> Commissions also have disallowed recovery of the costs of canceled nuclear projects and construction-cost overruns that they found to be imprudent.<sup>117</sup>

For many regulators, the disallowances may have been the only politically palatable regulatory response to the dilemma of either permitting huge rate increases with no equivalent return to the ratepayer, or requiring utility shareholders to assume enormous costs that could jeopardize the utility's continued existence.<sup>118</sup> Since its application in the unusual and politically charged nuclear plant cases, the prudent-investment standard has become controversial, and the utility industry is becoming increasingly uncertain about how commissions will evaluate investments under prudence review.

### B. *EMF-Related Costs*

One authority estimates that the electric-utility industry spends more

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113. See Richard J. Pierce, Jr., *The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity*, 132 U. Pa. L. Rev. 497, 514 (1984).

114. See Colton, *supra* note 111, at 416-21.

115. *Id.* at 423.

116. See *id.* at 424-25.

117. See John A. Anderson, *Are Prudence Reviews Necessary?*, Pub. Util. Fort., Feb. 1, 1991, at 24 (documenting \$10 billion of nuclear power plant prudence disallowances).

118. The regulatory extremes of complete inclusion and complete exclusion in rate base have been criticized as creating improper incentives for the utility industry to overinvest or underinvest in nuclear power. See Pierce, *supra* note 113, at 540. Although this may be present to some extent in the EMF context, the incentive to overinvest may not be as great because the critical decision affecting the implementation of prudent avoidance is not so much whether to build new capacity, but how and where to build. Moreover, the regulatory treatment of excess and abandoned nuclear plants arguably has created an incentive for the utility industry *not* to invest in new capacity. See Charles M. Studness, *The Failure of Utility Regulation and the Case for Deregulation*, Pub. Util. Fort., Sept. 15, 1991, at 26. Of more concern in the EMF cases, however, are incorrect signals of a different kind: the complete inclusion might encourage inefficient or unnecessary mitigation measures, and the complete exclusion might discourage socially desirable actions, such as prudent health and safety protective measures.

than one billion dollars on EMF-related expenses a year.<sup>119</sup> Utilities continue to incur significant expenses related to EMFs, and these expenses eventually will be passed on to ratepayers or shareholders or both.<sup>120</sup> Utilities incur two types of EMF costs: first, they incur costs siting and constructing a line, such as transmission-line design changes to reduce magnetic fields, alternative routes, and costs for purchases of wider rights-of-way; second, they incur ancillary costs, such as severance damages due to EMF fears, litigation expenses to defend against property and personal injury claims, regulatory compliance costs, and EMF research costs. Generally, construction-related costs are capital costs, eligible for inclusion into rate base and a reasonable rate of return thereon. Ancillary costs generally are operating costs, and utilities can recover these costs in the rates they charge ratepayers if the costs were prudently incurred.

Magnetic fields from transmission lines can be reduced in several ways, including: phase cancelation;<sup>121</sup> reducing the current;<sup>122</sup> increasing the distance of people from the line;<sup>123</sup> and placing the line underground.<sup>124</sup> Moreover, the design configurations available to build transmission lines produce varying EMFs. One study estimated that the costs of designs for above-ground lines with lower EMFs than the typical "base case"<sup>125</sup> design can range from \$220,000 to \$500,000 per mile of line, compared to the base case of between \$230,000 and \$260,000 per mile of line.<sup>126</sup> Similarly, a cost-effectiveness analysis of low-EMF-design options for electric utilities in the State of Rhode Island estimated construction costs for the design options to range from \$450,000 to \$550,000 per mile for an above-ground 345 kV line, as compared to \$390,000 for existing H-Frame designs.<sup>127</sup> The report noted, however, that these costs represent costs for material and installation only: "The utilities' total cost per mile would

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119. See *EMF Science Must Be Sound, Credible To Get Public Backing, Industry Say* [sic], Energy Rep., March 16, 1992, at 194.

120. See Philip S. McCune, *The Power Line Health Controversy: Legal Problems and Proposals for Reform*, 24 U. Mich. J.L. Ref. 429, 459 (1991) (stating that "delays and cancellations of construction projects [due to EMF concerns] have cost consumers billions of dollars in lost opportunities for cheaper, more easily transported power").

121. "Phase cancelation" refers to the technique of arranging the flow of currents to reduce the effects of another field of equal magnitude but opposite direction. See The Electric Transmission Research Needs Task Force, *Electric and Magnetic Field Reduction: Research Needs* 20-21, 23 (Jan. 15, 1992) (report submitted to Washington State Legislature).

122. See Commonwealth Assocs., Inc., *Cost Effectiveness Analysis: Mitigation of Electromagnetic Fields* 13, 15 (May 29, 1992) [hereinafter "Cost-Effective EMF Mitigation"] (report prepared for subcommittee of the Rhode Island State Legislature).

123. See *id.* at 16.

124. See *id.* at 21.

125. The typical "base case design" is a "conventional flat, horizontal conductor arrangement operated at 230 kilovolts (kV) with 300 amperes (amps) current for 125 megawatts (MW) of power; supported by wooden H-frame poles." The Electric Transmission Research Needs Task Force, *supra* note 121, at 28.

126. See *id.* at 26-27.

127. See *Cost-Effective EMF Mitigation*, *supra* note 122, at 15.

be much higher [considering] engineering design, licensing, right-of-way acquisitions and clearing, special structures or construction requirements, administration, interest costs, etc."<sup>128</sup> The greatest cost difference is between above-ground and underground lines. The estimated construction cost of a 345 kV underground transmission line is \$1,450,000 per mile.<sup>129</sup> Another study estimated a range of \$1,500,000 to \$2,000,000 per mile for a 230 kV underground line.<sup>130</sup>

In the second category of costs are costs that are ancillary to the construction of transmission lines. Severance damages represent the additional compensation to property owners for the decline in their property's market value because of the proximity of transmission lines to their property.<sup>131</sup> Utilities are increasingly incurring litigation expenses to defend against property and personal injury claims.<sup>132</sup> In fact, a New York utility spent two million dollars on attorneys and expert witnesses fees in defending against 140 landowners who claimed \$117 million in property devaluation due to "cancerphobia" associated with the lines.<sup>133</sup>

A number of utilities within jurisdictions that have adopted EMF standards have incurred costs to comply with statutory or regulatory requirements, such as wider rights-of-way, research, and design changes. Likewise, utilities whose certificates impose EMF-related conditions have incurred compliance expenses. The Energy Policy Act of 1992<sup>134</sup> authorizes \$65 million over the next five years, half of which the private sector will provide, for a research and public information program on the health effects of EMFs.<sup>135</sup> Almost every utility spends some money on EMF research, both through membership in either electric trade organizations, such as the Edison Electric Institute (EEI) or the Electric Power Research Institute (EPRI), or as part of its own independent research.

### C. *Ratemaking Treatment of Current Costs in the Face of Uncertainty*

Where states have legislatively established EMF standards or utility commissions require utilities to implement prudent-avoidance measures,

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128. *Id.* at 14.

129. *See id.* at 22.

130. *See* The Electric Transmission Research Needs Task Force, *supra* note 121, at 27; *see also* U.S. Dep't of Energy, *Electrical and Biological Effects of Transmission Lines: A Review* 83 (1989) (stating that underground lines cost 8-10 times more than comparable overhead lines).

131. *See Electromagnetic Fields: Criscuola v. New York Power Auth.*, Util. Indus. Litig. Rep., March 15, 1994, at 8750 (reporting that plaintiffs in the *Criscuola* case settled with the utility for \$24,000).

132. *See Public Interest Attorney Warns Utilities of More EMF Lawsuits*, Elec. Util. Wk., Sept. 16, 1991, at 3 (reporting that the Trial Lawyers for Public Justice warned utilities to expect more litigation on EMFs).

133. *See Pam Black, Rising Tension over High-Tension Lines*, Bus. Wk., Oct. 30, 1989, at 158, 160.

134. Act of Oct. 24, 1992, Pub. L. No. 102-486, 106 Stat. 2776 (codified in scattered titles of U.S.C.).

135. *See* 42 U.S.C.A. § 13478 (West Supp. 1994).



the commissions should allow the utility to recover the prudently incurred costs associated with complying with those laws or regulations, regardless of the state of evidence about EMF health effects. Commissions should treat EMF-compliance costs in the same way they treat pollution-control compliance costs and other health and safety compliance costs.

For a long time, commissions have allowed utilities to recover, as operating expenses, pollution control costs and other regulatory compliance costs.<sup>136</sup> With the passage of the Clean Air Act Amendments ("CAAA"), which require utilities to reduce sulfur dioxide (SO<sub>2</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions, utility commissions will wrestle with recovery and allocation issues that are related to pollution-control compliance costs on a much greater scale.<sup>137</sup> Regulators generally have not challenged recovery of prudently incurred CAAA compliance costs.<sup>138</sup> The issues in recovery of CAAA compliance costs typically relate to the manner of recovery.<sup>139</sup> Several states have even enacted legislation to allow for the preapproval of CAAA compliance plans, which are required under the CAAA.<sup>140</sup> These states permit utilities to recover investments in pollution-control equipment and associated operating costs that the CAAA requires.<sup>141</sup> Other states permit utilities to recover emissions fees that are imposed by state law<sup>142</sup> or to recover "prudently and reasonably incurred costs of environmental controls."<sup>143</sup> Utilities should be permitted to recover costs that they prudently spend to comply with EMF standards or to comply with commission decisions that require the utility to implement more costly technologies or other investments, because these are legitimate costs incurred in providing current service.

In requiring utilities to educate the public about EMFs from power lines, the California Public Utilities Commission addressed the issue of recovering these costs. One ratepayer interest group argued that the leg-

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136. See, e.g., *Virginia v. Virginia Elec. & Power Co.*, 89 Pub. Util. Rep. (PUR) 3d 395, 405 (Va. Ct. App. 1971) (environmental protection expenditures); *Re Iowa Power & Light Co.*, 103 Pub. Util. Rep. (PUR) 4th 139, 153 (Iowa Utils. Bd. 1989) (PCB cleanups).

137. Compare Ann F. Williams, *Reducing Pollution: Who Pays the Bill?*, Pub. Util. Fort., Jan. 15, 1991, at 28, 28-30 (as of 1989, before the CAAA were passed, 36 commissions reported they had not had rate cases involving pollution-control expenses) with Mary Nagelhout, *States Take Action on Clean Air Act Compliance*, Pub. Util. Fort., Dec. 15, 1992, at 37 (describing the increased action by commissions and state legislatures addressing CAAA compliance costs).

138. See James E. Norris, *Clean Air Act Compliance: State Regulators Respond*, Pub. Util. Fort., Apr. 1, 1992, at 31.

139. See *Re Mississippi Power Co.*, 135 Pub. Util. Rep. (PUR) 4th 8, 11 (Miss. Pub. Serv. Comm'n 1992); *Re Potomac Electric Power Co.*, 140 Pub. Util. Rep. (PUR) 4th 25, 170-72 (D.C. Pub. Serv. Comm'n 1993).

140. See 42 U.S.C. § 7651g(b) (Supp. IV 1992).

141. See Ind. Code Ann. § 8-1-27-12 (Burns 1991); Ohio Rev. Code Ann. § 4909.192 (Anderson Supp. 1993); Ky. Rev. Stat. Ann. § 278.183 (Baldwin 1993).

142. See *Re Ohio Rev. Code Ann. § 4905.31(B)(2)* (Anderson Supp. 1993).

143. Ill. Ann. Stat. ch. 220, § 1-102(b)(ii) (Smith-Hurd 1993).

islature, not the utilities, should appropriate funds for this purpose, or alternatively, that shareholders and unregulated utilities should share the EMF-education costs with ratepayers. The Commission disagreed, citing *Federal Power Commission v. Hope Natural Gas Co.*,<sup>144</sup> the seminal case in affirming that shareholders are entitled to an opportunity to earn a reasonable return on their investments. The California Public Utilities Commission said:

Prudent EMF costs associated with electric utility related work and facilities are a part of a utility's cost to provide energy services in a safe and efficient way. Absent substantive testimony . . . and a change in the regulatory policy of allowing utilities to recover reasonable costs incurred in the performance of utility service, shareholder funding for the EMF education program is not a viable alternative.<sup>145</sup>

Where utilities voluntarily implement prudent-avoidance measures, however, utilities face greater uncertainty in the recovery of the costs of those measures because these decisions involve considerably more utility discretion. While health effects of EMFs remain uncertain, if a utility voluntarily implements prudent avoidance or EMF mitigation, ratepayers could challenge the utility's expenditure as unnecessary or imprudent given the lack of evidence on EMF health effects, or they could argue that EMF-related investments are unnecessary to the provision of service, or fail to benefit ratepayers, at least for those not in proximity to a line where EMFs are reduced. These costs are problematic to commissions because, although these costs are not legally required for the provision of electric service, and the scientific evidence has not conclusively demonstrated that EMFs are harmful, denying recovery of EMF-related costs discourages arguably prudent safety measures and ignores the public's and customers' increasing concerns about EMF health effects.<sup>146</sup>

Past commission treatment of costs of voluntary investigations or cleanups of manufactured-gas plant (MGP) sites could provide direction to commissions confronted with challenges to a utility's recovery of EMF costs.<sup>147</sup> In the voluntary MGP cases, consumers have argued that they

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144. 320 U.S. 591 (1944).

145. *Re Potential Health Effects of Elec. & Magnetic Fields of Util. Facilities*, 147 Pub. Util. Rep. (PUR) 4th 361, 376 (Cal. P.U.C. 1993).

146. Although commissions will likely be conflicted about their role in situations where public controversy, rather than scientific controversy, pressures them to act, both commissions and utilities have a responsibility to respond in some manner to reasonable public health and safety concerns, regardless of the lack of scientific basis to support those concerns. This responsibility is derived in large part from the nature of businesses "affected with a public interest." See *supra* text accompanying notes 77-81.

147. Another example is commission treatment of voluntary contributions to the cleanup of the Three Mile Island (TMI) accident. In the TMI cases, the utilities voluntarily contributed sums to Edison Electric Institute, a trade organization of the electric utility industry, for the cleanup of the TMI nuclear-generating-station accident in Pennsylvania. The utilities argued that the costs were beneficial in adding to the knowledge of the operation and eventual decommissioning of the company's nuclear units, or that the contribution would "enhance the industry's knowledge of radioactive waste disposal,

should not pay for cleanup costs or investigation costs related to MGP sites that no government agency has ordered the utility to clean up.<sup>148</sup> At least one commission has rejected this argument, explaining that "failure to remediate voluntarily could result in the issuance of [a governmental order mandating cleanup], loss of control over the remediation activities, and higher costs."<sup>149</sup> In another decision, the commission noted that no government authority required any of the utility's cleanup programs. The commission said, however, "government inaction does not necessarily mean that no environmental hazard exists."<sup>150</sup> Due to the uncertainty of the utility's liability, the commission authorized \$2 million for investigations of hazardous waste sites, and it required the utility to file for approval of funding for cleanup efforts, followed by review of the costs in an Energy Cost Adjustment Clause proceeding.<sup>151</sup> The commission further required the utility to give first priority to mandatory cleanup and second priority to "sites which pose a significant public health threat."<sup>152</sup>

These voluntary MGP cleanup cases are similar to EMF cases in that failure to implement design changes now, before a line is constructed, could mean significantly higher costs later if EMFs are found to be harm-

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which will have long-term benefits for ratepayers." *Re Western Mass. Elec. Co.*, 80 Pub. Util. Rep. (PUR) 4th 479, 561 (Mass. Dep't of Pub. Utils. 1986). Commissions generally have rejected these arguments, explaining that the expenses are not research-related expenses because the expenses would primarily benefit TMI owners. *See id.* at 562; *Re Ohio Edison Co.*, 70 Pub. Util. Rep. (PUR) 4th 241, 267-68 (Ohio P.U.C. 1985); *see also Re Duke Power Co.*, 79 Pub. Util. Rep. (PUR) 4th 145, 174 (S.C. Pub. Serv. Comm'n 1986) ("While the Commission lauds Duke's efforts in participating in the TMI cleanup and being a leader in the nuclear industry in doing so, the Commission finds that this voluntary effort should be borne by the shareholders and not recovered through rates.").

The TMI cases differ, however, from the EMF cases where a utility voluntarily implements prudent-avoidance measures. In the TMI cases, the cleanup costs were contributed to property that the utility did not own, derive any benefit from, or use. The property had no connection with the contributing utility, except that another investor-owned utility owned the property. The primary recipient of the benefits of the contribution would be the other investor-owned utilities responsible for cleaning up the contaminated property. In EMF cases, prudent-avoidance measures will be spent on property used in the service of electricity, residents near the lines will derive benefit in reduced fields, or at least peace of mind, and ratepayers in general arguably derive a benefit because the utility is taking reasonable measures now to avoid the possibility of implementing more costly mandatory measures later.

148. *See Pacific Gas & Elec. Co.*, No. 86-12-095, 1986 Cal. P.U.C. LEXIS 886, at \*98 (Cal. P.U.C. Dec. 22, 1986); *Re Central Ill. Light Co.*, 124 Pub. Util. Rep. (PUR) 4th 498, 502 (Ill. Commerce Comm'n 1991), *rev'd on other grounds*, *Central Ill. Light Co. v. Illinois Commerce Comm'n*, 624 N.E.2d 819 (Ill. App. 1993) (remanding to the Commission for further proceedings in light of its recent conflicting decision in a generic coal tar proceeding).

149. *Re Central Ill. Light Co.*, 124 Pub. Util. Rep. (PUR) 4th 498, 504 (Ill. Commerce Comm'n 1991), *rev'd on other grounds*, *Central Ill. Light Co. v. Illinois Commerce Comm'n*, 624 N.E.2d 819 (Ill. App. 1993).

150. *Pacific Gas & Electric Co.*, No. 86-12-095, 1986 Cal. PUC LEXIS 886, at \*105.

151. *See id.* at \*106.

152. *Id.* at \*106-07.

ful.<sup>153</sup> Further, a utility that fails to implement design changes now may lose control over the type of design or technology-remediating devices that it can use in the future. As in *Re Central Illinois Light Co.*,<sup>154</sup> utilities should recover expenses related to the prudent avoidance of a potential health hazard, or expenses incurred now to avoid potentially greater costs later, if those expenses are prudently incurred. Thus, for example, implementing effective EMF mitigation measures at a "reasonable cost" or "low cost" would probably be prudent and recoverable. On the other hand, converting an existing transmission line underground solely to reduce public exposure to EMFs may not be prudent, given the lack of scientific evidence on EMF adverse health effects and the high costs of putting a line underground.<sup>155</sup>

In its prudence reviews, commissions will need to balance the public's health and safety concerns with ratepayers' interest in not paying for unnecessary utility expenditures. In balancing these concerns, a commission should consider the incentives that its decision will create for other utilities. Permitting recovery generally will encourage utilities to implement prudent-avoidance measures, which, depending on the commission, may be a desirable result. A commission that permits utilities to earn a rate of return on EMF capital investments, however, may encourage utilities to overinvest in capital-intensive, EMF-reducing technologies. Regulators have solved similar problems in other unusual rate cases<sup>156</sup> by allowing utilities to recover their investments but disallowing a return or a portion of the return thereon.

A factor not present in the MGP cases which may complicate a commission's task in reviewing EMF-related costs is determining what constitutes "prudent-avoidance" measures eligible for recovery. A question that may arise is whether a utility's purpose in implementing a particular EMF mitigation measure should matter for recovery purposes. Some transmission-line configurations and designs reduce magnetic fields more than others, but a utility may have chosen the configuration or design for reasons other than to reduce EMFs, such as to avoid delays and opposition to constructing the line.<sup>157</sup> Commissions will need to ask whether prudent-avoidance measures that a utility takes to minimize opposition to a line is bad faith or merely a reasonable business decision, or whether commissions should penalize utilities for accommodating public fears that science has not substantiated. The issue will arise, however, only

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153. For example, if the utility is required to convert a line underground, this conversion would be more expensive than if the utility had placed the line underground in the first place.

154. 124 Pub. Util. Rep. (PUR) 4th 498 (Ill. Commerce Comm'n 1991).

155. *Cf. Re Hawaiian Elec. Co., Inc.*, 151 Pub. Util. Rep. (PUR) 4th 30, 43 (Ha. P.U.C. 1994) (stating that placing a new line underground would not constitute prudent avoidance "because of the substantial cost that would be involved and the uncertainty regarding the health effects of EMF exposure").

156. See *infra* text accompanying notes 171-87.

157. See *supra* text accompanying notes 98-100.

where a utility has implemented measures that arguably constitute prudent avoidance and a commission decides or a party argues that the costs should be disallowed.

*D. Ratemaking Treatment of Historic Costs if EMFs Are Later Found To Be Benign*

If EMFs are found to be benign,<sup>158</sup> should regulators permit utilities that voluntarily rerouted lines or spent significant sums of money to mitigate potential EMF harms to include in rate base and earn a return on that portion of the capital investment related to EMF mitigation?<sup>159</sup> Even if a commission allows a utility to recover current EMF-related expenses, if EMFs are later found to be benign, a commission could exclude the portion of the capital investment related to EMFs from rate base. When a utility seeks to include EMF-related property in rate base or recover EMF-related costs, the commission must decide who should pay for the utility's incorrect prediction or arguably over-conservative reaction to EMF health risks, which at the time may have been considered "prudent avoidance."

A useful analogue, although by no means identical, is the excess capacity issue,<sup>160</sup> which arose when utilities incorrectly forecasted energy demands and some built nuclear facilities that were later canceled or contributed to a utility system's excess capacity.<sup>161</sup> In this EMF hypothetical, where EMFs are found to be benign, the utility similarly has incorrectly "forecasted" the scientific outcome of the health effects from EMFs, and it consequently invested in technologies or routes that make the transmission line more expensive than it would have been if the utility had not reacted at all to the EMF issue.<sup>162</sup> In both cases, regulators

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158. Although science cannot prove a negative, over time, a variety of experiments and studies that obtain negative results can persuade the scientific community to agree that there is no significant risk from EMFs. See M. Granger Morgan, *Prudent Avoidance*, Pub. Util. Fort., Mar. 15, 1992, at 26.

159. If the costs were operating expenses and the commission has already approved their recovery, then the utility commission generally cannot require the utility to refund these monies to ratepayers. The doctrine against retroactive ratemaking prohibits either the refunding or raising of rates to compensate for either over-earnings or under-earnings for service provided in the past, unless the utility had first obtained approval from the utility commission to expense an item or include an investment into rate base, subject to refund or a true-up later. Thus, if EMFs are later determined to be benign, the most likely ratemaking issue to arise is whether the utility should be allowed to continue including in ratebase the remaining portion of the EMF-related capital investment and earning a return thereon.

160. Although the issue to build nuclear power plants also involved risks of possible nuclear accidents and problems of nuclear waste disposal, these risks are not analogous to the EMF hypothetical because at the time the utility decided to build, these risks were known and regulated, whereas under this EMF hypothetical, they are not.

161. See *supra* text accompanying notes 109-17.

162. Also, in both cases, if the utility had decided not to invest in new capacity, and the nation's energy demands increased, or the utility decided not to invest in EMF-mitigating technology, and EMFs were found to be harmful, the outcome would be equally, if not more, costly. If the nuclear industry had decided not to build new power plants and

must allocate the historical capital costs of these "mistakes in retrospect."<sup>163</sup>

In the nuclear-excess-capacity cases, many commissions denied recovery of portions of nuclear plants representing excess capacity under both the used and useful and prudent-investment tests.<sup>164</sup> Similarly, in the EMF hypothetical, under the used and useful test, a commission could find all of the utility's property used and useful except that part related to mitigating EMF. Although the EMF-reducing technology or property may still be "used," it is no longer "useful" or necessary in providing service to customers, and current ratepayers do not derive any benefit from the EMF-reducing design technologies or other property used to minimize EMFs. Under the prudence standard, a commission could find that the utility's extra measures were unnecessary and wasteful, given that EMFs had not been determined to be hazardous at the time of the investment.

The following hypothetical is illustrative: a utility builds a line costing \$1 million, and \$500,000 of that sum was spent to reduce EMFs. The utility includes in rate base the \$1 million minus \$50,000 a year for depreciation. After 10 years, the scientific evidence overwhelmingly supports a conclusion that EMFs are not harmful. At this time, a

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the nation's energy needs increased, the consequences would be more costly than over-investment. See Pierce, *supra* note 113, at 540. In the case of the EMF hypothetical, if the electric industry forgoes implementing prudent-avoidance measures, and EMFs are later found to be harmful, then many people will have been unnecessarily exposed to a health hazard, and ratepayers may pay higher rates than would have been necessary if the utility had implemented prudent avoidance earlier.

163. Pierce, *supra* note 113, at 498. In the case of the nuclear projects, Professor Pierce has argued that although the obvious solution would appear to be allowing complete recovery of costs if the forecasts were unavoidable, three problems prevent the utility from recovering all of these costs: (1) full recovery would increase consumers' electric bills without any corresponding benefit; (2) full recovery completely insulates the industry from risks and mistakes that the regulated market must bear; and (3) the decisions relating to nuclear plants to overinvest were in part due to a flaw in cost-of-service ratemaking which creates an incentive for utilities to overinvest in capital investments. See *id.* at 542-43. Professor Pierce argues that the proper ratemaking treatment of excess capacity must take into consideration this regulatory incentive to overinvest. See *id.*

These same problems might also be present in the EMF hypothetical where EMFs are found to be benign. First, customers would face rate increases, although perhaps not as dramatic as in the case of the nuclear-power-plant cases, for which they receive no benefit. Second, in an unregulated market, a firm would bear the risk that its product might be defective or might pose unforeseeable dangers, and thus full recovery would be a dramatic departure from the way the unregulated market performs. Third, to the extent the decision to build differently permits the utility to overinvest, for example, by implementing technologies or designs more capital intensive than available alternatives, then the incentive to overinvest arguably also exists in the EMF context. Professor Pierce suggests that the Iowa Public Service Commission adopted "the most promising approach" to the excess capacity cases, which was to allow recovery of the capital investment, but to reduce a "utility's rate of return by an amount proportionate to the amount of excess capacity on the utility's system." *Id.* at 540-41 (citing *Re Iowa Pub. Serv. Co.*, 46 Pub. Util. Rep. (PUR) 4th 339 (Iowa Commerce Comm'n 1982)).

164. See *supra* text accompanying notes 109-117.

commission could prohibit the utility from including into rate base the portion attributable to EMF reduction, which after 10 years would be \$250,000, and the commission could limit the amount of depreciation to \$25,000 a year. Alternatively, the commission could allow the utility to include the \$250,000 of EMF-related property into rate base and deny a return on the investment, thus, in effect, allocating the costs between shareholders and ratepayers. Commissions sometimes have used the latter alternative in the atypical nuclear cases<sup>165</sup> and MGP cleanup cases.<sup>166</sup>

For equitable reasons, however, where the utility implemented prudent-avoidance measures partly as a result of public pressure or commission encouragement, utility commissions may be reluctant to disallow the EMF-related investments in rate base and permit a return thereon.<sup>167</sup> Commissions might find it difficult to disallow recovery of costs related to protecting the health and safety of the public, given the consequences if EMFs had turned out to be harmful and the utility had done nothing.<sup>168</sup> To the extent that commissions want to influence utility behavior, allowing recovery of prudent health and safety costs, even if these costs in hindsight are determined unnecessary, encourages utilities to be responsive to public and regulatory concerns as well as to err conservatively in implementing measures that may protect public health and safety.

#### E. *Ratemaking Treatment of Future Expenses if EMFs Are Later Found To Be Harmful*

On the other hand, if a utility chose not to implement EMF-reducing design technologies when it constructed a transmission line, should regulators allow that utility to pass on to ratepayers the costs of retrofitting or converting the line underground if EMFs are later determined to be harmful? Should commissions allow a utility to pass on to ratepayers the costs of defending litigation claims that EMFs from the line caused personal and property damages if the utility reasonably could have sited the line differently to avoid human exposure? Because the prudence standard in the utility context is essentially a negligence standard,<sup>169</sup> a commission could rule that a utility was imprudent if the utility builds a line close to schools or other sensitive areas in disregard of human exposure

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165. See Richard J. Pierce, Jr., *Public Utility Regulatory Takings: Should the Judiciary Attempt to Police the Political Institutions?*, 77 Geo. L.J. 2031, 2056 (1989) (discussing risk allocation as a third alternative for disallowing costs associated with excess capacity and canceled plants).

166. See *infra* text accompanying notes 178-87; *Re Coal Tar Cleanup Expenditures*, 137 Pub. Util. Rep. (PUR) 4th 272 (Ill. Commerce Comm'n 1992).

167. Cf. Colton, *supra* note 106, at 427-31 (discussing policy and constitutional considerations affecting prior regulatory encouragement of capacity expansion).

168. See *In re Application of Chesapeake Utils. Corp.*, No. 8157, 1989 Md. PSC LEXIS 81 (Md. Pub. Serv. Comm'n 1989).

169. See Pierce, *supra* note 113, at 511.

to EMFs when there were reasonable alternatives.<sup>170</sup> In contrast, regulators may find that not taking a particular EMF-mitigating action is prudent if the utility could show that it fully considered the EMF issues and reasonable alternatives before it sited and built the line.

In many ways, the recovery issues associated with EMF-related costs if EMFs are found to be harmful are similar to the recovery issues now confronted by the natural gas industry in the cleanup of manufactured-gas plant (MGP) sites. During the late 1800s and first half of the 1900s, MGPs manufactured gas from coal to use the gas for lighting and later, heating and other uses.<sup>171</sup> Gas manufacturing produced residuals, such as coal tars, coke, light oils, sludges, ash, and clinker, which at the time were not regulated as hazardous wastes or known to be harmful to the health and safety of the environment or people.<sup>172</sup> Although gas manufacturers sold or recycled some of these residuals, common industry practice during this time was to deposit residuals that could not be sold or recycled into dumps or ponds.<sup>173</sup> With the advent of the natural gas transmission industry after World War II, natural gas replaced manufactured gas.<sup>174</sup> When gas manufacturers dismantled the MGP sites, they disposed of or left some wastes at the site.<sup>175</sup> Today, former MGP sites are significant liabilities for gas companies, because the Comprehensive Environmental Response, Compensation and Liability Act<sup>176</sup> ("CERCLA") and similar state legislation require them to clean up these sites.<sup>177</sup>

In the MGP cases, every commission to address the issue has allowed a gas company to recover, either in whole or part, the costs associated with the investigation or remediation of an MGP site.<sup>178</sup> Two issues con-

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170. *Cf. Houston Lighting & Power Co. v. Klein Indep. Sch. Dist.*, 739 S.W.2d 508, 519 (Tex. Ct. App. 1987) (overturning \$25 million punitive damage award against utility for "callous disregard" in deciding to build a line on property near two schools); *Lazazera v. Commonwealth Edison Co.*, No. 90-0265, 1992 Ill. PUC LEXIS 163 (Ill. Commerce Comm'n May 28, 1992), *rescinded on rehearing*, 1992 Ill. PUC LEXIS 440 (Nov. 24, 1992) (in a complaint that a transmission line was located too close to a residence in part because of alleged adverse EMF-health effects, the commission found that the utility failed to obtain a certificate of public convenience and necessity, and therefore, the commission required the utility to relocate the line away from plaintiff's home).

171. *See* 2 David J. Muchow & William A. Mogel, *Energy Law & Transactions* 50.02[1][a] (1993).

172. *See Re Coal Tar Cleanup Expenditures*, 137 Pub. Util. Rep. (PUR) 4th 272, 276, 282 (Ill. Commerce Comm'n 1992), *aff'd*, *Central Ill. Light Co. v. Illinois Commerce Comm'n*, 626 N.E.2d 728 (Ill. App. 1993).

173. *See id.* at 276-77.

174. *See id.* at 276.

175. *See id.* at 277.

176. 42 U.S.C. §§ 9601 to 9675 (1988).

177. *See, e.g., John S. Boyd Co. v. Boston Gas Co.*, 992 F.2d 401 (1st Cir. 1993) (purchaser of gas and electric company held responsible for cleanup costs of coal gas and oil gas wastes caused by predecessor).

178. For a comprehensive and insightful examination of the rate recovery issues associated with MGP sites, see Paul K. Connolly, Jr., Scott J. Mueller, Meabh Purcell, *Environmental Legacies of Manufactured Gas Plants - Rate Recovery of the Cleanup Costs*,



sistently arise in the MGP cases, however: one, whether the company was prudent at the time it deposited the residuals;<sup>179</sup> and two, whether current ratepayers derive any benefit from these cleanups, or stated another way, whether the remediation costs are "operating costs."<sup>180</sup> In a generic proceeding to consider the issue of recovery of MGP cleanup-related expenses, the Illinois Commerce Commission ("ICC") found that industry practice at the time MGPs were operated and retired was "reasonable and prudent."<sup>181</sup> Therefore, the ICC created a presumption that "the operation and retirement of the Illinois MGPs were in conformity with industry practices at the time, and that individual company operations and retirements of MGPs were reasonable and prudent."<sup>182</sup> Other commissions have similarly found that the gas manufacturing industry's disposal practices years ago were prudent.<sup>183</sup>

With respect to the second issue, however, the ICC concluded that the MGP cleanup costs did not benefit current ratepayers. Therefore, the ICC announced that ratepayers and shareholders should share the costs, by denying the utility the recovery of carrying costs on the unrecovered balance of cleanup costs.<sup>184</sup> Commissions that require cost sharing between shareholders and ratepayers believe denial of the carrying cost of deferred cleanup costs will act as an incentive for utilities "vigorously [to] pursue potentially responsible parties and insurance claims."<sup>185</sup> In contrast, the Iowa Utilities Board and a number of other commissions found that MGP costs do benefit ratepayers because these costs are "current . . . and are legitimate costs of doing business."<sup>186</sup> These commissions generally allow utilities to collect remediation costs entirely from

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Original Presentation for the 13th Annual Legal Forum of the American Gas Association (1994). Some commissions permit the utility to defer the costs, for which ratemaking treatment will be determined later. See *Peoples Nat. Gas*, 144 Pub. Util. Rep. (PUR) 4th 333 (Minn. P.U.C. 1993). Others require utilities to amortize the costs over several years, with or without a carrying charge. See *Re Coal Tar*, 137 Pub. Util. Rep. (PUR) 4th at 301. Others permit recovery of a representative amount. See *Re Midwest Gas*, 133 Pub. Util. Rep. (PUR) 4th 380 (Iowa Utils. Bd. 1992).

179. See Connolly et al., *supra* note 178.

180. See *Re Coal Tar*, 137 Pub. Util. Rep. (PUR) 4th at 282.

181. *Id.* at 281.

182. *Id.* at 282.

183. See *Re Public Serv. Elec. & Gas Co.*, No. EE91111747, 1993 WL 50943 (N.J. Bd. Regulatory Commissioners Feb. 3, 1993); *Re Midwest Gas*, 133 Pub. Util. Rep. (PUR) 4th 380 (Iowa Utils. Bd. 1992); *In re Chesapeake Utils. Corp.*, No. 8157, 1989 Md. PSC LEXIS 81, at \*9 (Md. Pub. Serv. Comm'n June 9, 1989); *In re Peoples Gas Sys., Inc.*, No. 850811-GU, 1986 Fla. PUC LEXIS 586, at \*32 (Fla. P.U.C. July 8, 1986).

184. See *Re Coal Tar*, 137 Pub. Util. Rep. (PUR) 4th at 300.

185. See *Re Wisconsin Power & Light Co.*, No. 6680-UR-108 (Wisc. Pub. Serv. Comm'n Sept. 30, 1993) (LEXIS, Energy Library, ALLPUR file).

186. *Re Midwest Gas*, 133 Pub. Util. Rep. (PUR) 4th at 389; see *Re Northern States Power Co.*, 73 Pub. Util. Rep. (PUR) 4th 395, 420 (Minn. P.U.C. 1985); *Chesapeake Utils. Corp.*, 1989 Md. PSC LEXIS 81; *Re Jersey Power & Light Co.*, 65 Pub. Util. Rep. (PUR) 4th 175, 178 (N.J. Bd. Pub. Utils. 1985). One California utility argued that current ratepayers derive benefits that its predecessors did not enjoy, thus "evening out" benefits and costs among intergenerational ratepayers:

ratepayers, and some commissions reasoned that recovery was necessary to encourage utilities to clean up the sites.<sup>187</sup> Commissions confronted with tough recovery issues often consider the incentives their decisions will create for a utility; as these cases demonstrate, however, commissions do not always agree on which message they want to send.

If EMFs are found to be harmful, then the situation is similar in some ways to the MGP cases: in the MGP cases and the EMF hypothetical, the actions have posed a health hazard all along, but we only discovered the hazardous nature of the "products" recently. Because we probably will not know definitively anytime soon whether EMFs are harmful,<sup>188</sup> future commissions in EMF cases will confront the same difficulties as commissions currently involved in MGP cases in evaluating decisions that utilities made years ago. In both cases, eliminating or reducing the health hazards will be very expensive.

EMF cases, however, differ from MGP cases in three major respects, the first two of which will affect how commissions apply the prudence standard. First, and on one hand, the EMF hypothetical is different because utilities arguably have known, or should have known, that EMFs *may* be a health hazard, whereas during their period of operation, MGP owners had no reason to believe that gas manufacturing byproducts were unsafe.<sup>189</sup> The issue of when utilities are on notice that EMFs may be harmful is critical both in the ratemaking context and the tort context. Although at this time it is doubtful that commissions would impute knowledge of a hazard to utilities, because there is no scientific evidence to conclude that EMFs are harmful, a court or agency could conceivably impute to a utility knowledge that EMFs *may* be a health hazard and consequently conclude that the utility should have taken precautions. Thus, a commission arguably could find that a utility that constructed a line without due regard to EMF concerns was imprudent in not anticipating the possibility that EMFs may be found hazardous.<sup>190</sup>

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"Over the years, these transmission systems have largely been depreciated and, in a sense, paid for themselves. Today's customers then get a very substantial, very low cost gas transmission service from those gas pipeline[s].

So, today's customers get a very substantial benefit from what amounts to yesterday's activities. The point I was making here is that we can't . . . draw such fine distinctions between yesterday's benefits and yesterday's costs versus today's benefits and today's costs, because they get merged, and they get blended."

*In re Pacific Gas & Elec. Co.*, No. 86-12-095, 1986 Cal. PUC LEXIS 886, at \*99 (Dec. 22, 1986) (quoting PG&E witness testimony).

187. See *In re Ratemaking Treatment for Remediation of Hazardous Waste*, 115 Pub. Util. Rep. (PUR) 4th 275, 277 (Mass. Dep't Pub. Util. 1990); *Re Niagara Mohawk Power Corp.*, 140 Pub. Utils. Rep. (PUR) 4th 481 (N.Y. Pub. Serv. Comm'n 1993).

188. See M. Granger Morgan, *Prudent Avoidance*, Pub. Util. Fort., March 15, 1992, at 26 (stating that it is likely to take more than a decade to conclude whether EMFs pose "any significant risk to public health").

189. See *In re Coal Tar Cleanup Expenditures*, 137 Pub. Util. Rep. (PUR) 4th 272, 277, 282 (Ill. Commerce Comm'n 1992).

190. *Cf. Houston Lighting & Power Co. v. Klein Indep. School Dist.*, 739 S.W.2d 508,

Second, and on the other hand, most jurisdictions require utilities to obtain commission approval before constructing and operating a line, whereas approval was not generally required for the construction of MGPs.<sup>191</sup> In these jurisdictions, and particularly in cases where a commission actually considered EMFs during the decision on whether to allow a utility to construct a line, a utility commission might be hard-pressed to declare, for example, that a utility imprudently constructed a line along a preapproved route because of the risks associated with EMFs. Future commissions would most likely find that a utility's failure to mitigate EMFs today prudent, because of the lack of evidence of EMF health effects available at the time the utility made the decision to build, the difficulty in proving imprudence,<sup>192</sup> and the inequity of determining the prudence of actions that a utility took decades ago.<sup>193</sup>

The third difference between the MGP cases and the EMF hypothetical affects how commissions can apply the used and useful standard to utilities' property. In the MGP cases, often the utilities no longer use, or even own, the property where they perform the cleanups,<sup>194</sup> whereas many of the costs that utilities will incur to minimize EMFs will be related to property used in providing service to customers (i.e., the transmission lines and rights-of-way). EMF mitigation measures will therefore be more directly related to the provision of utility service than are MGP-cleanup costs. These differences do not, however, mean that attempts to recover EMF-related costs, if EMFs are later found to be harmful, will meet with any less opposition or uncertainty than similar attempts in the MGP cases. Utilities that failed to consider EMF mitigation when constructing a line may later confront ratepayer opposition to paying for EMF mitigation that the utility could have implemented ear-

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519 (Tex. Ct. App. 1987) (landowner alleged that utility's decision to take an easement of his property, which served as a campus for two schools, was an abuse of discretion and a "callous disregard for the safety, health, and well-being of the 3,000 plus children" attending the schools, and the jury below agreed and awarded the landowner \$104,275 in actual damages and \$25 million in punitive damages, and the appeals court upheld the actual damages award, but overturned the punitive damages award because the utility did not commit a tort for which punitive damages could be assessed); *Lazazzera v. Commonwealth Edison Co.*, 133 Pub. Util. Rep. (PUR) 4th 495 (Ill. Commerce Comm'n 1992) (requiring utility to relocate line running along alleyway behind complainant's home to four-lane street and forest preserve away from residences, in part as a remedy for the utility's failure to obtain a certificate; however, complaint raised concerns about safety of line, including EMFs), *rescinded on rehearing*, No. 90-0265, 1992 Ill. PUC LEXIS 440 (Ill. Commerce Comm'n Nov. 24, 1992).

191. See Environmental Research & Technology Inc., Handbook on Manufactured Gas Plant Sites 3-58 to 3-59 (1984) (omitting any reference to permits or other approvals that might have been sources of information on history of MGPs).

192. See *Pierce*, *supra* note 113, at 512.

193. See William A. Badger, *Prudence Reviews: New Approaches Are Needed*, Pub. Util. Fort., July 15, 1992, at 22, 25.

194. See, e.g., *Pacific Gas & Elec. Co.*, No. 86-120-95, 1986 Cal. PUC LEXIS 886, at \*98 (Cal. P.U.C. Dec. 22, 1986) (of the 74 sites where utility expected to conduct cleanup, 43 were not owned by utility).

lier, at less cost, and without having unnecessarily exposed people to EMFs.

#### IV. A PROPOSAL FOR THE RECOVER AND ALLOCATION OF EMF-RELATED COSTS

##### A. *Recovery of Current EMF-Related Costs*

Like other regulatory compliance costs, utilities should recover mandatory EMF-related costs. Utilities incur these EMF-related costs to comply with regulatory requirements, and therefore these costs are necessary to the provision of current service. Although these costs are subject to the prudent-investment test, regulators should only apply this test to determine whether the costs that a utility incurred to satisfy the regulatory requirements were reasonable or cost effective. There is no need to inquire into the EMF-health risks at the time the utility made an EMF-related investment. If a commission has preapproved EMF-related expenditures, then it should likewise permit the utility to recover those costs.

Where a commission has chosen not to regulate EMFs, and no scientific consensus on the health effects of EMFs exists, the utility must decide how best to respond to EMF issues. Commissions should interfere in such decisions only if management abuses its discretion or acts in some other imprudent manner. Utilities are statutorily required to provide safe and reliable service. Voluntary prudent-avoidance costs are a legitimate cost of providing safe service that regulators should review like any other operating costs incurred by utilities: if the investment in EMF mitigation was prudent, based on information reasonably available at the time the investment was made, regulators should permit the utility to recover those costs.

The argument against assigning those costs to shareholders is that the ratemaking process limits the amounts that utilities can collect, and therefore, the ratemaking process should correspondingly limit the amounts a utility can lose.<sup>195</sup> The argument for requiring shareholders to pay for EMF-related costs is that a utility should be responsible for the risks that accompany the services it provides; but if regulators allow a utility to recover these costs, then the risk has passed on to ratepayers. Just as a firm in an unregulated market bears the risk that its product may be defective, so too should regulated firms bear the risks inherent in the products or services they sell. Utilities, however, are governed by

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195. Cf. Badger, *supra* note 193, at 25 (discussing rolling prudence reviews as a potential solution to minimizing risk of prudence disallowances); Lawrence Kolbe & William B. Tye, *Who Pays for Prudence Risk?*, Pub. Util. Fort., Aug. 1, 1992, at 13 (arguing that risk of prudence disallowances creates an asymmetric payoff structure when not "balanced by an equivalent chance for gain"); Charles M. Studness, *Implications of Imprudence Deregulation for Utility Financial Policy*, Pub. Util. Fort., May 1, 1992, at 29 (predicting that in times of rising electric rates, imprudence disallowances will become more likely).

both regulation and market forces. Utilities are neither so regulated as to be essentially operated by government, nor so unregulated as to be entirely governed by market principles. Therefore, the risks that utilities assume should not correspond to those assumed by either market entities or government-run entities.

Utilities do assume risk, however. Utilities are only given an *opportunity* to earn a reasonable return on their investments. Consequently, regulators expect utilities, both conceptually and politically, to assume some business risks. In addition to business risks, utilities also assume risks peculiar to regulated industries; because of the prospective nature of ratemaking, utilities risk that they may incur greater costs than regulators permitted them to recover, but future rates cannot compensate for those losses.<sup>196</sup> Another risk that utilities assume as a result of the ratemaking process is "prudence risk," i.e., utilities risk that regulators may disallow as imprudent expenditures that the utilities incurred. There will always be some uncertainty about the ratemaking treatment of EMF costs, and consequently regulators may be unable, under the current cost-of-service ratemaking structure, to allocate definitively to utility shareholders the risk that EMFs may later be determined harmful. For example, a utility that fails to mitigate EMFs prudently now does not bear the full risk that EMFs may later be determined harmful if ratepayers *may* have to bail the utility out later. Similarly, ratemaking symmetry does not exist if a utility is limited in the rates it collects, but regulators *may* require the utility to absorb huge losses from EMF damages that are not necessarily the utility's fault. But this inability to allocate risks definitively is not necessarily a flaw; rather, it appropriately reflects the utility industry's quasi-regulated nature.

Moreover, utilities that are permitted to recover voluntary EMF-related costs will not have passed on to ratepayers the entire risk that EMFs may be determined harmful. If a utility does not implement prudent avoidance today, then a utility risks substantial financial and legal liabilities if EMFs are later determined to be harmful, the costs of which may or may not be recoverable from ratepayers. Similarly, if a utility implements prudent-avoidance measures today, then the utility risks that a commission may disallow the remainder of the utility's capital investment in EMF mitigation if EMFs are later found to be benign. Thus, the utility still bears the risk that its service may be defective, but only if the utility also bears the risk that a commission might deny recovery of the costs if the utility's decision was imprudent at the time it was made. Although this prudence risk is not as great as the risk that unregulated firms assume for potentially defective products, this reduced risk is appropriate if one accepts the symmetry argument above: that regulators should limit both a utility's windfall gains and extraordinary losses.

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196. Alternatively, utilities may incur fewer costs than permitted to recover and thus make some short-term gains.

### B. *The Allocation of EMF-Related Costs Among Ratepayers*

In addition to the problem of assigning financial responsibility for EMF costs between ratepayers and utility shareholders, if commissions allow recovery, then the EMF cases raise issues about allocating the costs among ratepayers themselves. Ratepayers who are exposed to EMFs because of their proximity to the line have different interests than those who do not live or work near any lines. Allocating EMF-related costs among all ratepayers may be unfair to those who do not receive any benefit from those costs. If a utility recovers from all ratepayers costs spent in minimizing EMFs from a distribution line or a line that services a discrete portion of a service area, then all ratepayers will be subsidizing the few ratepayers who benefit from reduced fields.<sup>197</sup> Moreover, if utilities spent additional costs to select a different route for the line because of opposition by one group of ratepayers, it would be even more unfair to require the people exposed to EMFs because of the new route to pay for the increased costs associated with the route change.

One possible solution is to give ratepayers more policy-making responsibility<sup>198</sup> to reflect more accurately the risks they bear.<sup>199</sup> Ratepayers are likely to vary widely in their tolerances and perceptions of risk. Regulators could give ratepayers a voice in how to reduce the purported risks, given the mitigating measures' respective costs and what is currently known about the health risks of EMFs. Commissions could give those who live nearby transmission and distribution lines more responsibility to decide whether and how to respond to the uncertain risks.<sup>200</sup> Allowing residents to choose whether to pay for "extras" not otherwise required in the provision of service is not new.<sup>201</sup> For example, several state statutes authorize the governing body to create local improvement districts upon the initiative of either a governing body or a majority of property owners in the proposed district for the purpose of converting

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197. The argument is also raised in opposition to demand-side management programs, where all ratepayers are assigned the cost of the program from which only a few receive the benefits of reduced energy bills.

198. Commission staff and ratepayer interest groups represent ratepayers or the public interest to a large degree already, however.

199. Cf. Joseph P. Tomain, *Law and Policy in the Activist State: Rethinking Nuclear Regulation*, 38 Rutgers L. Rev. 187, 234 (1986) (arguing that, to realign financial and policy-making responsibility in the nuclear regulatory arena, either the ratepayers should be given more policy-making responsibility or those responsible for the costs should take more responsibility for their risks).

200. See, e.g., Philip S. McCune, *The Power Line Health Controversy: Legal Problems and Proposals for Reform*, 24 U. Mich. J.L. Ref. 429, 466 (quoting one citizen as stating "We're going to pay for [power-line construction] if [the lines are] above ground [or] buried . . . . We consumers are paying for it, and we want to have a say in what happens.").

201. See Undergrounding Pol'y Advisory Comm., *Electric Undergrounding Policy Recommendation Report*, at 1-2 (July 27, 1993) (prepared for the Colorado Springs City Council).

existing overhead electric transmission lines to underground locations.<sup>202</sup> If at any time during the required public hearing "the governing body is presented with a petition signed by at least a majority of the property owners owning at least a majority of the assessable land of the proposed district protesting the proposed improvement, . . . the district and project shall be abandoned."<sup>203</sup> Utilities assess the costs of converting the lines underground upon the properties that benefit from the conversion.<sup>204</sup> Although legislatures enacted these statutes several decades ago for aesthetic reasons, similar regulatory initiatives are emerging to allow residents to choose whether they wish to pay for costs to reduce EMFs while the health effects of EMFs are still unknown.<sup>205</sup>

For example, Kansas Power & Light Company filed a tariff that required residents, who proposed a route different from the one that the utility proposed because, among other reasons, of concerns about EMFs, to pay for the extra costs in siting the line along the alternative route.<sup>206</sup> The tariff provided:

If any governmental subdivision requires Company to construct, remove, or relocate ("change") Distribution or Transmission facilities ("required facilities") when Company, absent such requirement, would do otherwise, and where the recovery of the additional cost for such change is not otherwise provided for, the cost incurred by Company to

202. See Colo. Rev. Stat. Ann. § 29-8 (West 1990); Wash. Rev. Code Ann. § 35.96.030 (West 1990); Utah Code Ann., § 54-8-4 (1993).

203. Colo. Rev. Stat. Ann. § 29-8-112(4) (West 1990). The Colorado statute was upheld against constitutional attack in *Lyman v. Town of Bow Mar*, 533 P.2d 1129, 1132-33 (Colo. 1975).

204. See Wash. Rev. Code Ann. § 35.96.030 (West 1990). The Colorado Springs City Council adopted another variation, applicable to placing new and existing lines underground: it appointed a citizens committee to develop recommendations for a policy to place transmission lines underground. The Citizens Committee recommended that new overhead lines in developed areas be placed underground, and that a System Improvement Fund be created through a monthly customer charge to finance the additional cost of placing an existing line underground:

Th[e] fund would be made available on a matching basis to provide neighborhoods, private interests or public entities a mechanism to share the cost of burying power lines. If not used as a matching fund, procedures would allow for the fund to be used to bury lines providing the most aesthetic benefit to the entire community.

Undergrounding Pol'y Advisory Comm., *supra* note 201, at 2.

205. In a survey of electric utilities across the country, utilities reported that they choose the following options for financing new transmission lines underground:

[T]he most popular option for financing the additional cost of underground transmission, mentioned by 17 Utilities (73.9%) was to pass the costs on to all ratepayers. Obtaining financing from property developers was also mentioned by 8 Utilities (34.8%). Monies from the Principal User(s) of a line was cited by 3 Utilities (13.0%), and from Local Government by 2 Utilities (8.7%). Financing by Franchise Agreements, by Improvement Districts, and by Localized Surcharges were each cited once.

*Id.* at app. D summary.

206. See *KPL, City Agree Residents Seeking Line Rerouting Should Cover Costs*, Util. Envtl. Rep., Mar. 19, 1993, at 9.

make such change shall be assessed against the customers located within the governmental subdivision through a monthly surcharge

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The utility estimated that the cost of its proposed route was \$733,552, and the route preferred by the neighborhood association, \$1,088,903. The City Commission unanimously granted the permit for the line along the neighborhood's preferred route, and "unanimously recommended to the [utility] Commission that the surcharge tariff be based on a per customer basis over a five year period."<sup>208</sup>

Although the cost-bearers and those living near transmission lines would have a greater say in how much risk they are willing to tolerate and how much they are willing to spend to reduce that risk, this potential solution creates other problems. Alternative routes that are chosen because of their ability to avoid more people will almost always place the line in someone else's backyard. If ratepayers like those in Lawrence, Kansas pay for alternative routes to avoid exposure to EMFs, then people who otherwise would not have been exposed to EMFs if the first group of residents had not "paid" to avoid the utility's proposed route will face EMF exposure. In addition, the second group of residents, or any other residents who may be affected by a line's proposed route, may be unable to afford higher electric rates due to EMF reduction or may be unable to organize politically to oppose the proposed route. Thus, moderate and high income residents might be able to eliminate lines in their backyards, and the utility would build the lines in the neighborhoods with residents who are least able either to object to a proposed line or to pay for EMF mitigation.

Giving ratepayers more policy-making responsibility for the risks they bear may be an appropriate solution for resolving aesthetic issues, or even for determining whether utilities should place existing lines underground on the basis of public concern over EMFs or retrofit existing lines that service a discrete group of ratepayers, such as distribution lines or rural lines. The costs associated with these changes directly relate to the service these residents receive and the rates they pay for that service. The Colorado and Washington statutes can serve as models for states that wish to provide their citizens in these situations with the choice of whether to place a line underground.

Issues arise, however, if commissions give ratepayers a greater role in choosing *where* to locate a proposed line or *how* to construct a proposed line. First, if commissions allow ratepayers to choose whether to pay the

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207. *In re Western Resources, Inc., dba KPL, Relocation of Facilities Tariff* (April 14, 1993) (filed with the St. Corp. Comm'n of Kan., No. 93WSRE323TAR).

208. Letter from City of Lawrence to Susan Cunningham, Legal Department, Kansas Corp. Comm'n, dated (Sept. 10, 1993) (on file with author). At least one other utility is also considering allowing specific customers to pay for EMF abatement. See *Puget Power Considering Voluntary EMF Abatement Option on Customer Bills*, Elec. Power Alert, Feb. 17, 1993, at 7.



additional costs to locate a line somewhere else, then unless the commission also prohibited the ratepayers who would be affected by the second proposed route from proposing yet a third route, conceivably, utilities could never build transmission lines. For similar reasons, local governments are prohibited from dictating where or how a line should be built:

If [the city] had the right by its ordinance to specify how [the utility] should design and install its transmission lines or require it to spend this substantially greater sum in constructing said lines, then other municipalities would have like authority. . . . If 100 such municipalities each had the right to impose its own requirements with respect to installation of transmission facilities, a hodgepodge of methods of construction could result and costs and resulting capital investment could mushroom. As a result, the supervision and control by the Public Service Commission with respect to the company, its facilities, its method of operation, its service, its indebtedness, its investment, and its rates which the General Assembly obviously contemplated would be nullified.<sup>209</sup>

Moreover, this solution could unfairly affect fixed-income residents and residents least able to organize politically. If residents can essentially "buy" a route or "buy" underground protection, then only those neighborhoods that can afford it will be protected from exposure. Finally, regulators should leave the decision of where to locate and how to construct a transmission line to the utility, subject to the reasonableness reviews that utility commissions conduct in siting proceedings.<sup>210</sup> There is no consensus on what constitutes "prudent avoidance,"<sup>211</sup> and there cannot be until we know more about EMFs' effects. The decision of whether to implement prudent avoidance should be left to the prerogative of utility management. Although there is no guarantee that a utility will not choose neighborhoods least able to oppose a transmission line, the utility is more likely to be driven by total cost and other logistics in deciding where to locate a transmission line, rather than entirely by neighborhood opposition.<sup>212</sup>

When utilities decide to implement prudent-avoidance measures, other

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209. *Florida Power Corp. v. Seminole County*, 579 So. 2d 105, 107 (Fla. 1991) (quoting *Union Elec. Co. v. City of Crestwood*, 499 S.W.2d 480, 483 (Mo. 1973)).

210. *Cf. Re Hawaiian Elec. Co., Inc.*, 151 Pub. Util. Rep. (PUR) 4th 30, 41-42 (H.A.P.U.C. 1994) (in responding to argument that the district in which a line was proposed contained a disproportionate share of "negative impacts" of such lines, the commission said: "[w]hile we sympathize with the residents . . . who will be directly affected by HECO's proposed overhead transmission lines in this docket, we will not, without additional justification, order HECO to place the . . . lines underground for social equity reasons.").

211. See *supra* text accompanying note 41.

212. For a proposal to provide utilities with incentives to select the route that reduces EMF exposure at the lowest cost, see Morgan *et al.*, *supra* note 92. In some areas, the neighborhood develops near preexisting transmission lines. See *Re Virginia Elec. & Power Co.*, No. 890057 (June 13, 1991) (LEXIS, Energy Library, ALLPUR file) (noting that plaintiff residents moved into the area after the transmission line was built).

than those assignable to a specific residential group, commissions should permit utilities to allocate these costs among all ratepayers, rather than charge only those whose property the line traverses. These costs should be allocated among all ratepayers because these costs are system costs, i.e., costs incurred in the provision of safe electric service to all.<sup>213</sup> By contrast, it is fair to assess charges to property owners who benefit from distribution lines placed underground because individual property owners almost exclusively enjoy the benefits. Moreover, if EMFs are later determined to be harmful, arguably all ratepayers will have derived benefits from prudent-avoidance measures that a utility took earlier: ratepayers who live near the lines receive benefits from reduced magnetic fields, and all ratepayers receive benefits from avoiding significantly higher costs in implementing design changes to existing lines. If EMFs are found to be benign, no group benefits to the exclusion of others.<sup>214</sup>

### CONCLUSION

While the health risks of EMFs remain uncertain, both utilities and the public must face choices about how to respond to these uncertainties. The individual has some control in whether to reduce his or her exposure to EMFs by, for example, not using electric blankets, but for the most part, because EMFs are as ubiquitous as electricity, an individual cannot completely avoid EMFs. The industries whose products or services are associated with EMFs are in the best position to reduce potential risks, and they have the most control over who and how many people will be exposed to the risks their products or services create. Therefore, those who produce EMFs, including electric utilities, should decide whether to initiate prudent safety and health measures, at least while there is no conclusive scientific basis to conclude that EMFs cause adverse health effects, and regulators should not discourage them from doing so.

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213. The argument that it is unfair for some ratepayers to pay for the costs of EMF-reduction if they do not derive any benefits from those costs weakens when the treatment of similar costs is reviewed. For example, all ratepayers share in the costs of rate proceedings, where the utility's interests are often in direct conflict with the ratepayers' interests and where the utility argues for the allocation of charges to the benefit of some ratepayers and to the detriment of others; and all ratepayers share in the costs of other transmission-line safety measures, which may only benefit those in proximity to the line, utility employees, or other discrete groups.

214. One group that may benefit is the ratepayers whose aesthetic sensibilities were spared because a line was rerouted to avoid their properties. However, this merely maintains the status quo: utilities build lines on some residents' property and not on others, but those whose property is significantly affected are theoretically adequately compensated.